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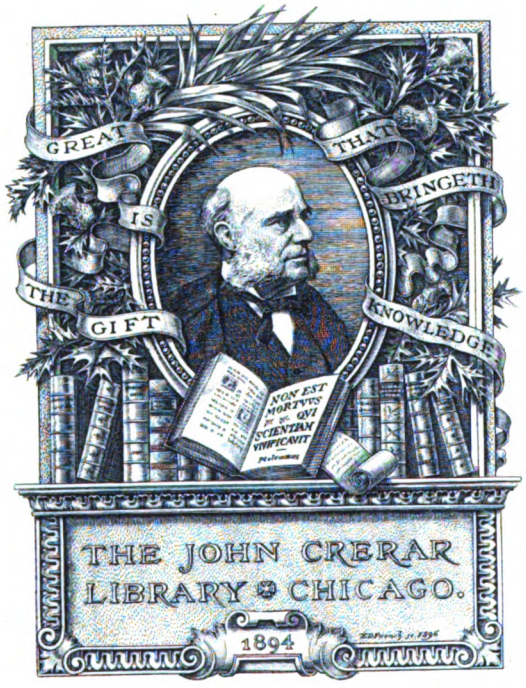

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VOLUME XIV. SATURDAY, JULY 7, 1906 NUMBER 1

Drawing Submarine Cable with a Locomotive

By John Putnam.

Illustrations from photographs by the author.

In a preceding article was described the method of laying submarine cable from a lighter, and that was stated to be the usual method. The conditions that existed in the case that we are about to describe were such as are not infrequently encountered, but the method of dealing with them we believe to be sufficiently original to merit description. The cuts used in the former story were made from the upper decks of various adjacent boats, the top of the pilot house of the tug, and several other conveniently elevated points. The pictures shown with the present article will take the reader from one shore of the Connecticut River to the other on the rear of a switch engine, and will give him the bright sunshine and clear air of a spring day.

On account of congestion in four cables crossing the Connecticut River at Middletown, the Southern New England Telephone Company found it necessary, in the early spring of this year, to lay an additional fifty pair submarine cable at this point. It was not convenient to get a tug and lighter from New London, forty-five miles distant, as it was the season when the ice was going out of the river. Not that ice would have had any deterrent influence with the construction men had it filled the river from bank to bank, for a number of years ago a cable was laid at this place by first laying it across on the ice and then cutting a slot in the frozen covering of the river through which the cable was carefully dropped and lowered to its permanent bed.

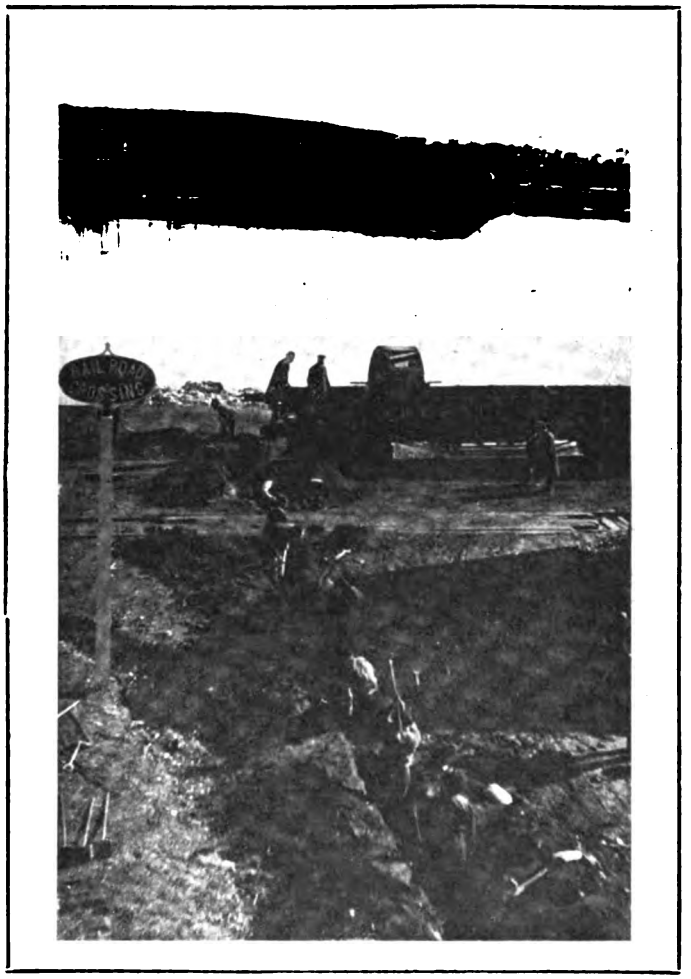

Fig. 1. Submarine cable on flat car, in position to be pulled across river. Conduit in trench will lead to terminal pole.

In this later instance, however, it was determined to utilize the water of the stream as a conduit and pull the cable into it. Liquid conduit is surely something new in the telephone world! The cable being 1,640 feet long and weighing 10,060 pounds, would unquestionably require considerably more force to pull it in than would be exerted by a horse attached to a windlass, so a locomotive was selected as about the proper mechanism for this work, the lay of the land lending itself readily to the plans for connecting engine and cable.

To understand this let us refer to Fig. 1. In this picture one is standing on the west bank of the river looking east. On the far shore just beyond the railroad bridge is the stretch of track along which the locomotive exerting the pull is to run. The cable is to be laid from the end of the trench which the men are digging in the foreground to the opposite bank, but will pass under the bridge and to the north of it, as that is the situation of the cable house. The reel of cable can be seen on the gondola which brought it from the manufacturers. It has been raised from the floor of the car by means of blocking upon which rests a steel shaft that passes through the center of the reel, thus leaving it free to turn upon an axis. The trench will contain the duct through which the cable will run from the water to the cable terminal pole on the west side of the river.

In Fig. 2 the lagging is being stripped from the reel, after which the long bolts that pass through the heads of the reel will have to be taken out, and the cable can be unreeled as readily as one would unroll a spool of thread. Although the specifications for a similar submarine cable were printed in a former number of this paper, it may be well to review them at this point. This cable consists of fifty pairs of No. 19 gauge Brown & Sharp copper conductors 1,640 feet long. Its weight is 10,060 pounds. The conductors are first covered with a silk winding. This is to increase the dielectric strength of the insulation. Over the silk are two wrappings of paper wound in opposite directions. The conductors are twisted in pairs with the lay not exceeding three inches. They are then laid up in a cylindrical coil in reversed layers, and the coil covered with two wrappings of paper. Over the conductors is a sheath 5-32 of an inch thick and made of lead with a 3 per cent alloy of tin. Three layers of jute are wound in reverse directions over the lead, and outside of these

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Fig. 2. Workman stripping lagging from the cable reel.

is an armor of iron wire, No. 4 Birmingham wire gauge. Over the armor are two reversed layers of hemp that has been saturated with a preservative compound, while finally comes a coat of whitewash to prevent the separate convolutions of the cable from sticking together or to the reel. The conductor resistance is about 45 ohms per mile, and the insulation resistance not less than 500 megohms per mile.

Liquid conduit cannot be rodded, but a wire can be carried over it in a boat and dropped. This wire can then be fastened to the cable and the cable pulled in. The start of this operation is shown in Fig. 3. On an ordinary line wire reel in the center of a boat is placed a coil of ⅜-inch seven strand messenger wire. The end is being pulled ashore by one man. The boat is then rowed from this point to the pier on which the opened draw of the bridge rests. The same operation is gone through with, starting from the opposite shore of the river, and the ends of the two messengers carefully and strongly spliced together. There is consequently a ⅜-inch seven strand steel wire rope extending from one bank of the river to the other along the route which the cable is to follow.

Fig. 3. Boatmen preparing to carry drawing rope from the west shore to middle pier of the bridge.

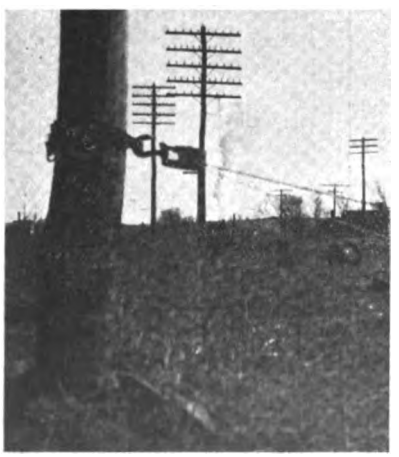
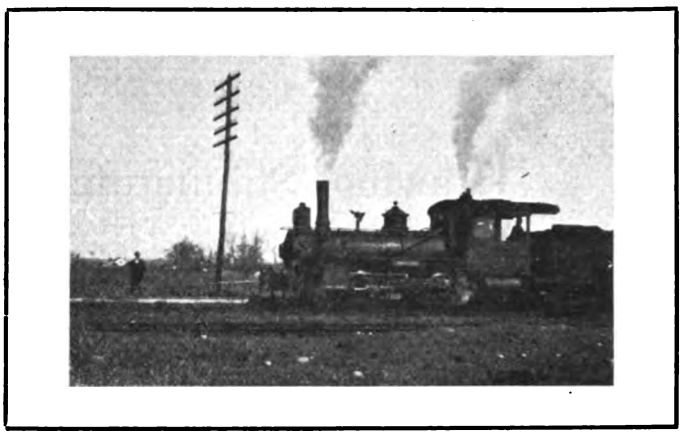


Fig. 4. A steel rope is run from the locomotive through snatch blocks to the river.

On the west shore it is attached to the cable, while on the east side it is led from the river bank up the slope of the shore, through a snatch block attached to a telephone pole, thence through a snatch block attached to a rail of the railroad track, and from there to the drawbar of the locomotive, to which it is securely fastened. In Fig. 4 this is all plainly shown. At the left of the picture is the snatch block attached by a chain to the pole. The messenger wire can be seen passing through it from the river, and off to the railroad track, while in the distance the engine is seen with smoke and steam rising over it.



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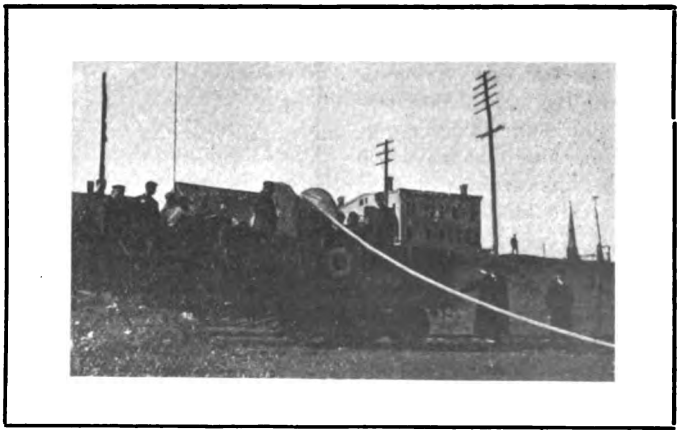

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In addition to this brake another is used, called the emergency brake. If the reader will look at Fig. 7 he will see its construction. The cable is running over the surface of a smoothly sawed stump that has lodged on the river bank. To keep the cable from sliding off, a drill is driven into the stump on one side of it, and a lever of iron pipe chained at one end, is then held down firmly over it by a man at the other end who is ready to increase the pressure if necessary. Stray blocks of ice may be noticed in the picture floating down stream and clearly telling of the season of the year.

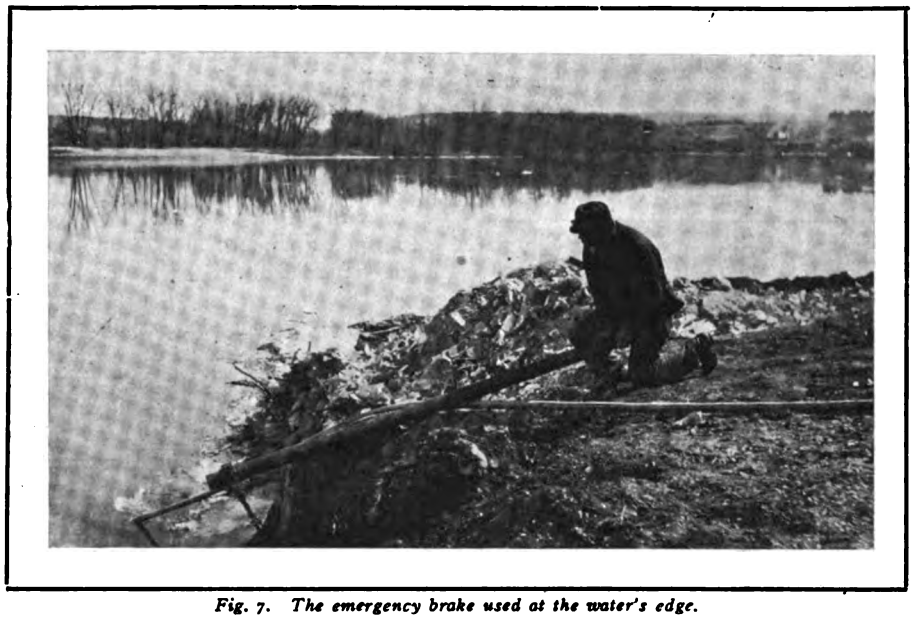

Fig. 7. The emergency brake used at the water's edge.

One more incident and the story is told. When the cable was started across the river the end was placed in a boat in order that it might not drag on the bottom unnecessarily. The old-fashioned flat bottom boat that had safely carried many a fishing party on the Connecticut River, stayed on the surface until the middle pier of the bridge was reached, when, the cable becoming too heavy, it sank. The locomotive, cable and submerged boat continued on their course, however, and when the latter emerged on the east shore the row boat was well rinsed off and none the worse for its underwater trip. Just sixteen minutes of time were consumed from the moment the cable entered the water on the west shore until it came out of the river on the east side.

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By Edward B. Jackson.

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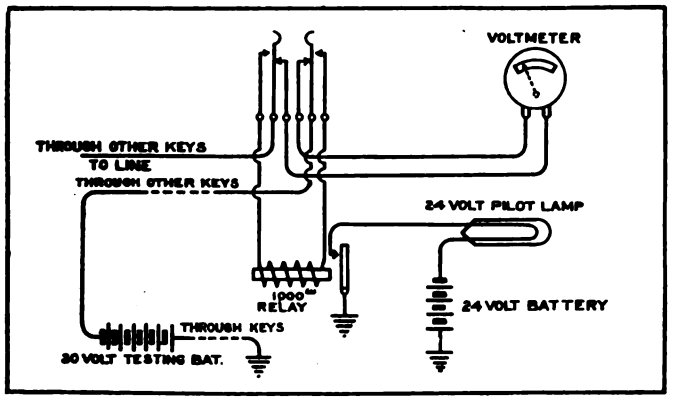

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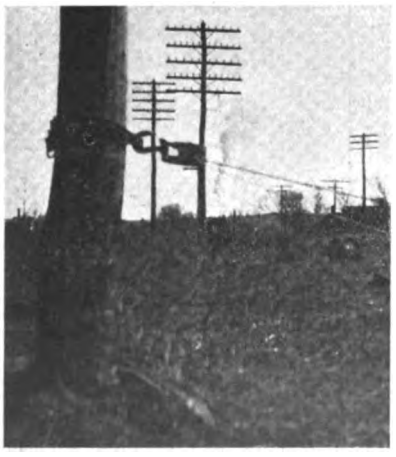

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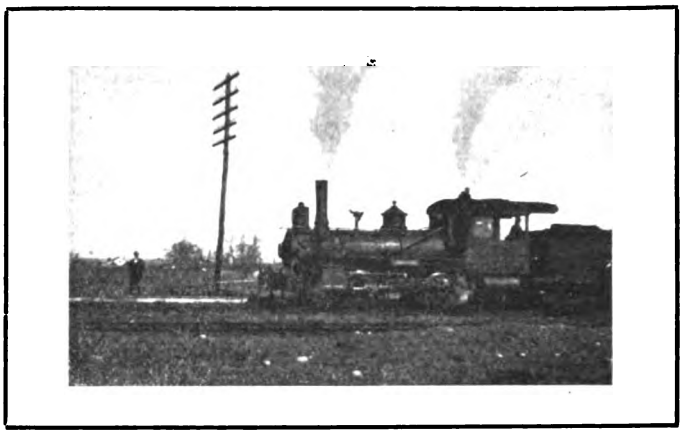

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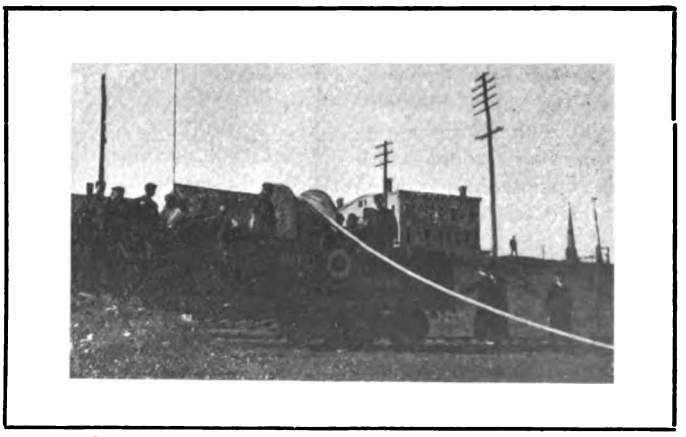

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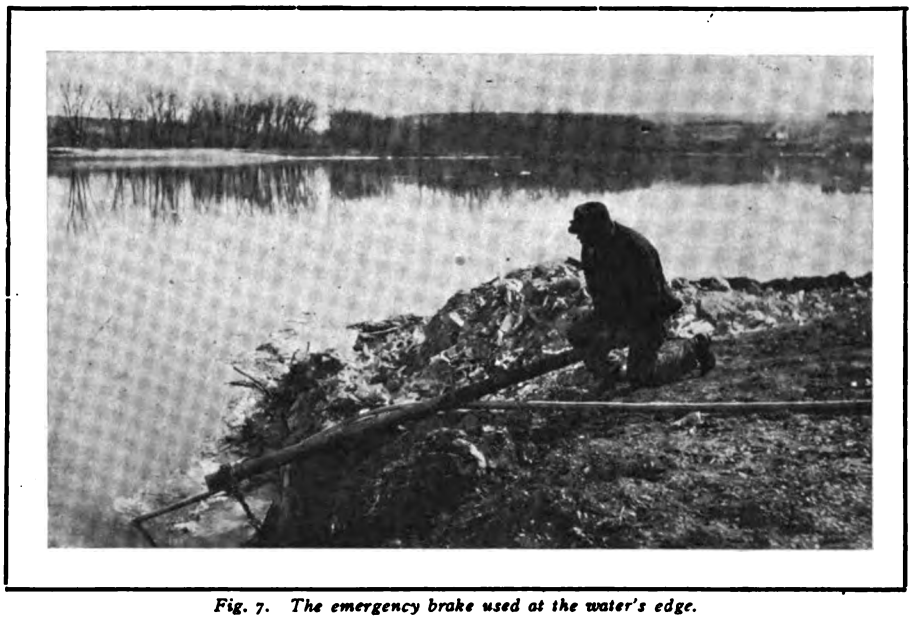

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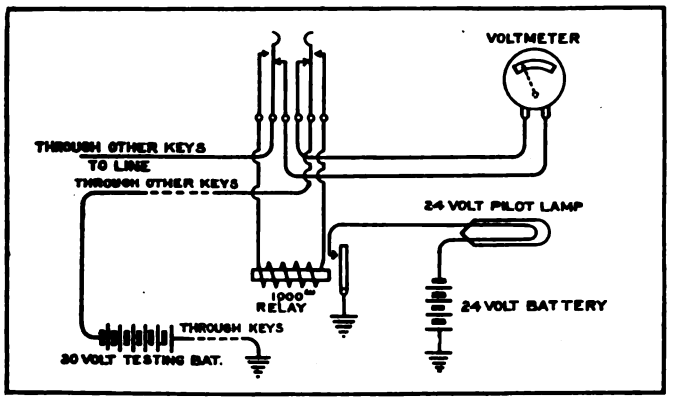

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Telephone Exchange Engineering

ARTICLE XXIV—THE MAIN AND INTERMEDIATE DISTRIBUTING FRAME AND RELAY RACK.

By Ray H. Manson, Chas. A. Simpson and Albion D. T. Libby.

CHANGES in a subscriber's directory number are very undesirable. In order to avoid them it is necessary to provide some means to enable any outside line entering the exchange to be connected to any set of multiple jacks in the switchboard. As an example, suppose "A," should move from one part of the city to any other part, the telephone company would then

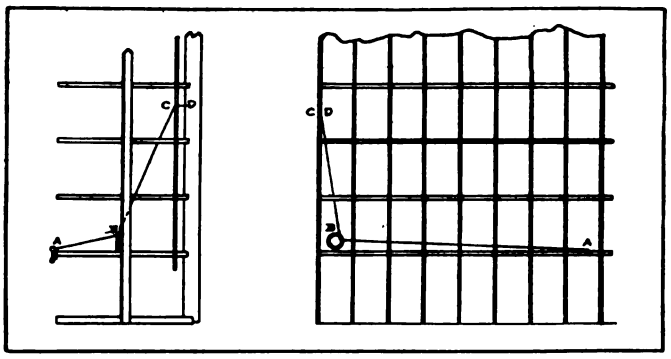

Fig. 109. Method of running jumper wires at main distributing frame.

connect his telephone to any spare wire that might be in the district in which he has moved. His telephone number being likewise the number of the multiple jack to which his line is connected it is obvious that if the subscriber is to keep the same telephone number there must be some means at the exchange whereby this new *outside* line can be connected to the old line *inside* the exchange. This is accomplished by means of the main distributing frame shown in Fig. 108.

As the frame answers the purpose of connecting two lines (one inside and one outside the exchange) to each other by means of short lengths of wire, it has been found very convenient to terminate all outside lines on one side of the frame and all inside lines on the other side and run the connecting, or "jumper" wires, between the respective sets of terminals.

The frame is so built that all parts are in plain sight and easily accessible. On the side to which the outside lines are brought, in the example exchange described in this series of articles, terminal strips are mounted on wooden strips, of maple, extending horizontally the length of the frame. The side of the frame which carries these strips is called the horizontal side. The wooden strips, A, are supported by small flat iron bars, B, fastened to the main vertical angle irons, C.

The terminal strips are eight inches long and each one has mounted upon it forty "U"-shaped, tinned brass connectors, or punchings, held in place by hard rubber strips screwed to the main strip of wood. These connectors are staggered so that there will be plenty of room to solder the jumper wires to them. The wires from the outside are soldered to their lower ends and the jumper wires leading to the arresters on the other side of the frame are soldered to the upper ends.

The small flat iron bars, B, which hold the horizontal terminal strips in place, extend through to the other side of the frame and form a support for the iron bars on which the lightning and sneak current arresters are mounted. This side of the frame is called the "vertical" side. In the example exchange these bars are long enough to mount one hundred and sixty pairs of arresters

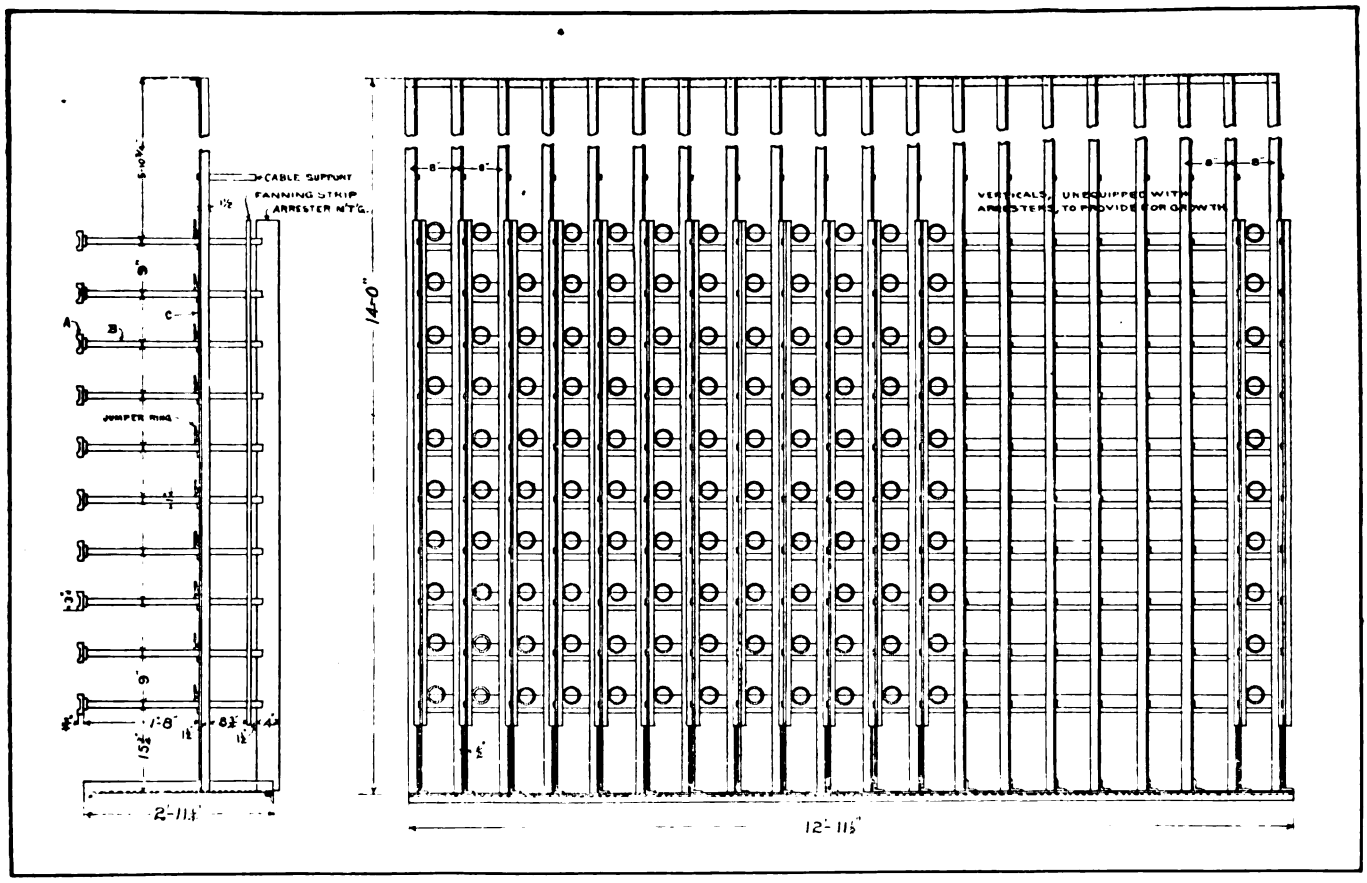

Fig. 108. Main distributing frame, showing arrangement of horizontal and vertical mounting bars, fanning strips and rings for supporting crosswiring.

and are four inches wide by one-half inch thick. They are made of cold rolled steel. The arresters are mounted upon them on half inch centres in groups of twenty, each group being spaced on eleven-inch centres.

Just behind each strip of arresters is fastened a small maple

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board, which is called a fanning or jumper strip. There are two holes in this jumper strip for each pair of arresters, one on each side of the strip. One of these holes is for the pair of wires taken out of the cable leading from the switchboard and the other is for the pair of jumper wires from the terminals on the horizontal side. These jumper strips are mounted far enough away from the vertical angle irons to permit as many 21-pair cables to lie side by side as there are groups of twenty pairs of arresters on a bar, with about two inches additional space. For each group of twenty arresters there is an iron jumper ring, each fastened to the rear of a vertical angle iron and projecting into the space to the right. These rings are used as guides for the jumper wires and are covered with vulcanized rubber to prevent any wire from coming in contact with the frame. The rings are open, in order to enable a man to insert or remove a jumper wire without threading it through.

is soldered. The solder has a very low fusing point, so that when a slight excess of current passes through the coil which surrounds it sufficient heat is produced to cause it to soften. Since the two ends of the coil are engaged in two springs in tension the end soldered to the core will be released and thus ground or open the circuit, arresters being made to do the former only, or to accomplish both functions at the same time.

The carbons are generally separated by means of perforated micas. At the perforation there is sometimes provided a small globule of metal having a low fusing point, which melts very quickly when the carbon becomes a little heated by current jumping across from the insulated carbon to the grounded carbon. This metal when melted makes a good connection between the two carbons, thereby preventing any arcing and, at the same time, thoroughly grounding the line. The frame work is grounded by a heavy insulated copper wire, so that any current that blows the

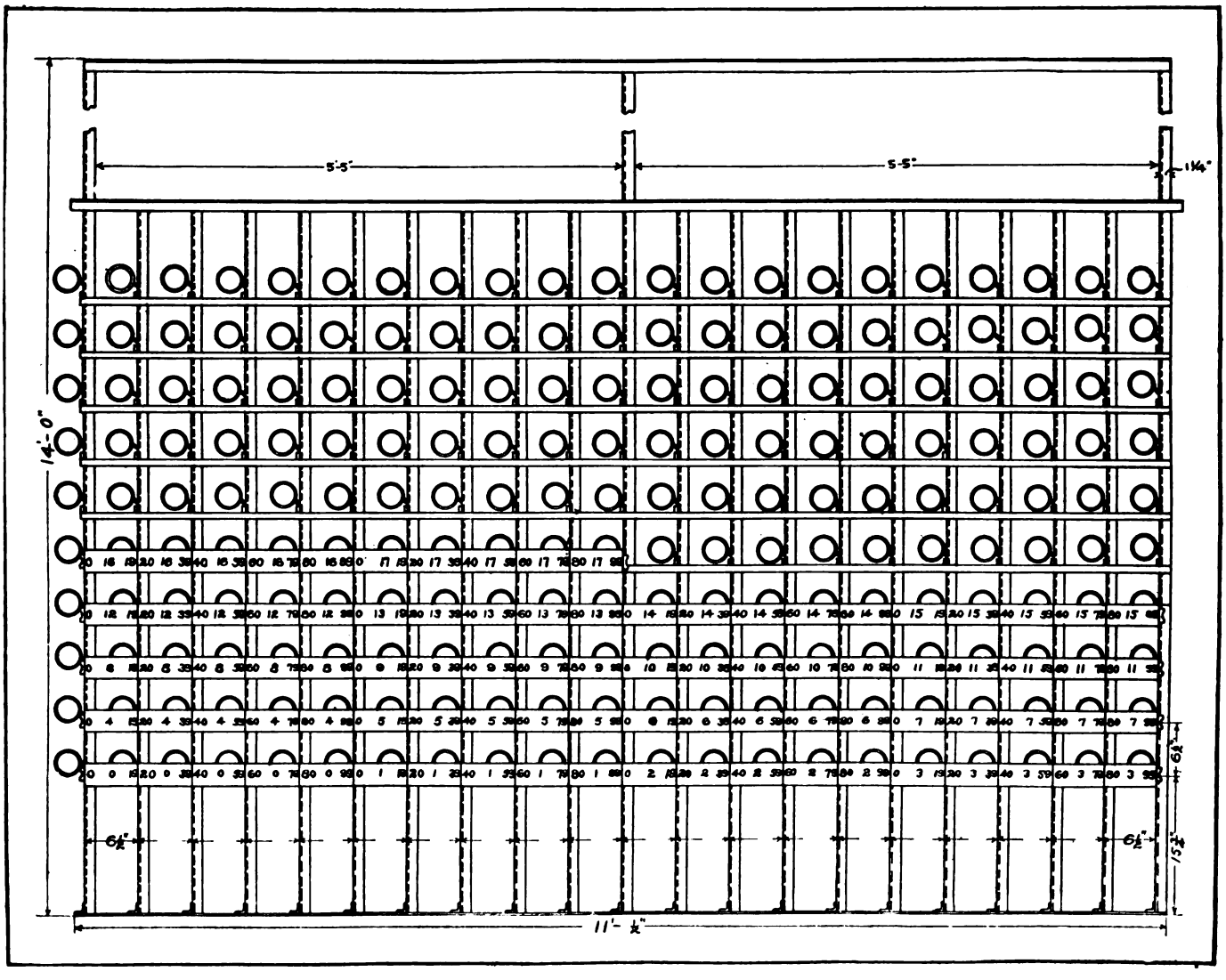

Fig. 110. Arrangement of intermediate distributing frame, showing numbering of terminals on the horizontal side in the "example" exchange.

The heavy angle irons at the bottom of each vertical iron are for supporting the frame over the usual slot in the floor through which the outside cables are brought.

The arrester is so designed that the heat coil will ground the outside line if a current of one-quarter of an ampere passes through it continuously for thirty seconds, or if a current having a voltage of three hundred or over passes through the coil the outside line would be immediately grounded by jumping the air gap at the carbons. In this way the arrester protects the switchboard apparatus from injury due to any foreign currents.

The heat coil in the example exchange is a small spool, having a brass core and ends and is wound to about 7½ ohms resistance. One end of this core is hollow and into it one end of the winding heat coil or passes through the lightning arresters to the iron mounting strips may be carried off to earth.

An iron rack is located above the arresters and in the rear of the arrester bars to support the cables coming from the intermediate distributing frame.

The horizontal terminal strips are numbered from left to right. The forty brass connectors on a terminal strip are staggered so that a pair corresponds to a hole at the top and a hole at the bottom of the strip. Each number serves for one hole at the top and one hole at the bottom of the pair of connectors, so that No. 1 serves for conductors 1 and 2; No. 3 serves for conductors 3 and 4; No. 5 serves for conductors 5 and 6, etc.

Facing the horizontal side of the frame the numbering of the

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strip grows from top to bottom and left to right in the following manner: The first strip on top at the left will be numbered 1 to 40, the next strip below 41 to 80, the third 81 to 100 and 1 to 20, the fourth 21 to 60, the fifth 61 to 100, the sixth 1 to 40, the seventh 41 to 80, the eighth 81 to 100 and 1 to 20, the tenth 21 to 60. Beginning at the top again, the second strip from the left will be numbered 61 to 100, the next strip below 1 to 40, etc. In this manner the numbering continues on downward and for each successive strip corresponding to each vertical angle iron the numbering grows from top to bottom and left to right.

Subscribers' lines, trunk lines and order wire lines are numbered in the same manner, each kind being kept separate from the others.

As stated previously, the outside lines are soldered permanently to the terminal clips on the line or horizontal side of the main frame, and the lines coming from the switchboard are permanently soldered to the arresters on the vertical side. Now the inside and outside wires must be connected together. This is done by means of duplex, flame-proof jumper wire, usually No. 20, B. & S. gauge, with the insulation of one wire red (for the ring wire) and the other white (for the tip wire). The method of running jumper wires is shown in Fig. 109. Suppose it has been decided to connect the outside line, which terminates on the horizontal side at the pair of clips A in the lower horizontal, to the inside line terminating in arrester at D located in the first arrester strip. The end of the jumper wire, which is wound on a spool, is passed over the top of the above mentioned horizontal at B and through the frame to the right of the upright on which is located the bar carrying arrester D. The ends of the wires are then passed through the holes in the fanning strip at C and soldered to the terminals provided at the rear of the springs of the arrester.

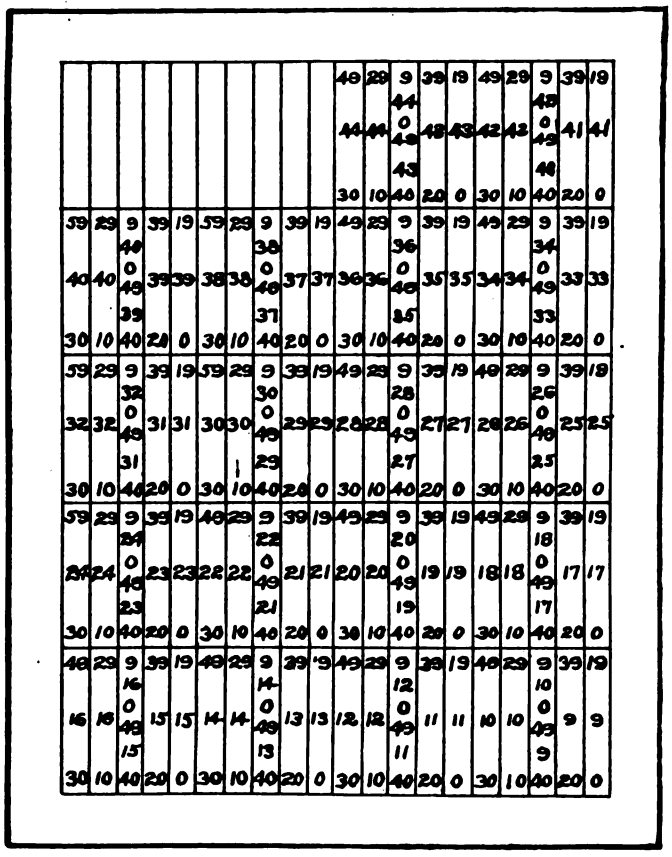

Fig. 111. Numbering of terminals on the answering jack side of the intermediate distributing frame in the example exchange.

The wire is then slipped into the jumper ring B between the verticals just above the horizontal in question. When on the horizontal side of the frame the jumper wire is then carried along the length of the frame to A, and after being pulled taut, is cut off and soldered to the terminal.

The intermediate distributing frame is used for the distribution of lines within the exchange. Suppose a certain operator at the switchboard had many busy lines terminating in her position, while another operator at some other position had lines terminating at her position which were not so busy. Then the natural thing to do would be to devise some means to equalize the work.

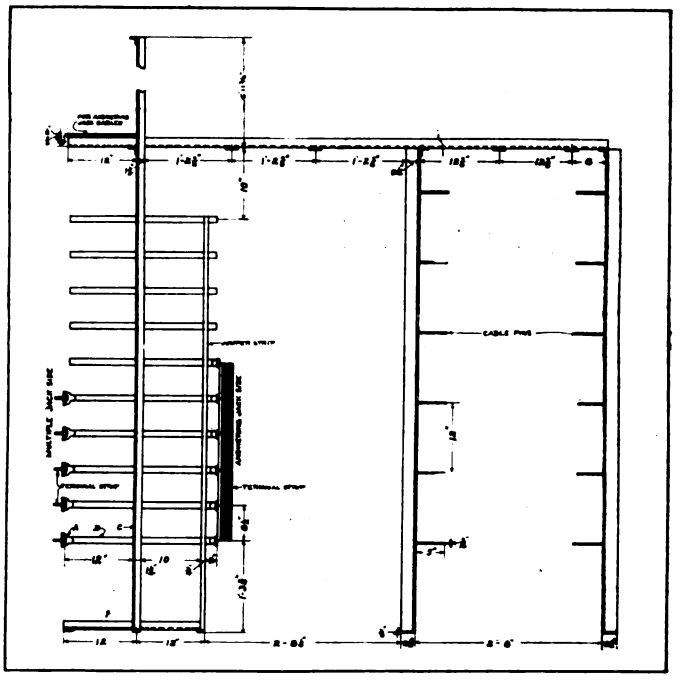

Fig. 112. End view of intermediate distributing frame and the two relay racks showing cable rack on top.

This is accomplished by means of the "intermediate distributing frame." Through its agency and the removable number plates of the answering jacks, or in some cases removable number caps over the line lamp signals, the equalization of work is accomplished without changing the relation of the subscriber's line to the multiple jacks and hence the subscriber's number.

The general construction of the frame is shown in Figs. 110 and 112. On one side of this frame are located terminal strips on which the wires in cables from the multiple jacks and the arresters on the main frame terminate, and on the other side are located strips to which the wires from the answering jacks, lamp jacks and line and cut-off relays are connected. The one is called the "horizontal" side, because the terminal strips are arranged in horizontal rows, and the other is called the "vertical" side, because the terminal strips are arranged in vertical rows.

Referring to Fig. 110, it will be noted that each horizontal run is divided into twenty groups or terminal strips. Each strip has sixty clips, and since the line circuit in the example exchange requires one clip for the 'tip," one for the "ring" and one for the "sleeve," it will be seen that a strip will correspond to twenty lines or one strip of multiple jacks. These clips are mounted in three rows of twenty each. The outer row is for the tip, the middle for the ring and the inner one next to the wood mounting for the sleeve. The clips in each row are slightly offset from the clips in the row next nearer the frame. This is done in order to have each wire come straight from the hole in the jumper strip to its terminal, and thus, by drawing the wire taut when soldering to the clip, there will be small chance of its becoming crossed with any of the other clips. The terminals project through the hard rubber strip on both sides about one-quarter of an inch. The rubber strips holding them in place are securely fastened to maple strips which have twenty holes above and twenty holes below for jumper wires and wires from the switchboard cables respectively. The terminal strips on the vertical side are exactly the same in construction.

The terminal strips are fastened to wood mounting strips, which are held in place by brass castings, A, Fig. 112. These brass castings are secured to the ends of the cross bars B, which, in turn, are fastened to the main vertical angle irons C. These

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cross bars extend through the frame, the other end being fastened to the vertical terminal strip in the same manner.

The frame has been so designed that there are twenty terminal strips in each row, so that each horizontal equipped will have enough terminal clips for four hundred lines

With this type of frame it is usually the custom to install framework for the ultimate capacity and to so distribute the present equipment that it may be easily within reach and, at the same time, reduce the length of the jumper wires as much as possible. Fig. 110 shows the arrangement and numbering of the lines on the horizontal side. It will be noted that this numbering corresponds to the numbering of the multiple jacks shown in Figs. 102 and 103 (see AMERICAN TELEPHONE JOURNAL of January 13, 1906). The terminal strips are numbered 0 to 99 in sets of five strips each. The number in the middle of each terminal strip refers to the hundred. With this arrangement it is easy to quickly find any line.

Fig. 111 shows the arrangement and numbering of the lines on the vertical side. It will be noted that this numbering corresponds to the numbering of the subscriber's lamp jacks shown in Figs. 102 and 103 (see AMERICAN TELEPHONE JOURNAL of January 13, 1906). The terminal strips are numbered 0 to 49 in groups of fifty lines each. It will be noticed that each group of 0 to 49 has a different number located between the numbering. This number refers to the panel of the switchboard in which these lamps and answering jacks are located. By this numbering arrangement it is easy for the wire chief to keep records showing the exact location of any answering and lamp jack which is connected to any multiple jack by means of the jumper wire.

The running of the jumper wires is accomplished in the same manner as described for the main distributing frame, except that the jumper wire consists of four wires twisted together, each wire having a distinctive color.

There are two relay frames used in the example exchange, designated as No. 1 and No. 2. Relay frame No. 2 is shown in Figs. 113 and 112. The other frame is a duplicate.

These frames have to be made very strong, as they support the line and cut off relays which have considerable weight. The uprights are made of heavy "T" irons which are held in place at the bottom by a heavy flat iron and at the top by an angle iron. In addition to this, angle irons extend from one relay frame to the other at the top, the same angles also extending to the intermediate distributing frame. It will be seen that this makes a very rigid framework. Cable pins are provided at each frame to which the cables from the intermediate distributing frame are laced.

Each relay mounting strip is arranged for ten line and ten cut-off relays, the two kinds being mounted alternately. A removable sheet iron cover is provided for each strip of relays. This cover fits close to the mounting and is used to prevent dust from collecting on the relay contacts.

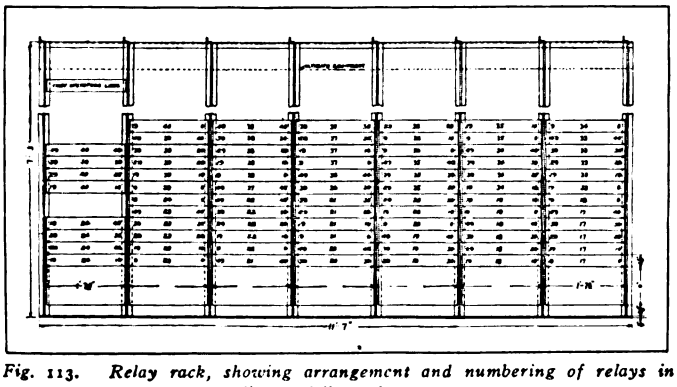

Fig. 113. Relay rack, showing arrangement and numbering of relays in "example" exchange.

The bays of the relay frame are a factor of the number of uprights of the intermediate distributing frame, the distance from centre to centre of three uprights being equal to one bay of the relay frame. This is merely for convenience of the cabling between relay frames and the intermediate distributing frames.

Figs. 114 and 113 show the numbering and arrangement of the line and cut-off relays on relay frames No. 1 and No. 2 respectively. By comparing the numbering in these two figures with the numbering of the terminal strips on the vertical side of the intermediate distributing frame shown in Fig. 111 it will be seen that they correspond. This is as it should be, as a line and cut-off relay is always associated with a certain answering jack, with its corresponding lamp jack. The line and cut-off relays corresponding to the first, third and fifth rows of terminal strips, Fig. 111, are located on relay frame No. 1 and are arranged as shown in Fig. 114. Those corresponding to the second and fourth rows of terminal strips, shown in Fig. 111, are located on relay frame No. 2 and are arranged as shown in Fig. 113.

The numbers located in the middle between each upright of the relay frame refer to the panel at the switchboard, in which are located the corresponding spring jack and lamp jack.

At the bottom of each bay of relays is located a "distribution board." This is made of maple and has a number of punchings fastened in it to which are soldered the battery leads from the fuse board and the line and cut-off relays.

ANNUAL MEETING OF KENTUCKY INDEPENDENT ASSOCIATION.

REPRESENTATIVES from almost every town and city in the state attended the annual meeting of the Kentucky Independent Telephone Association, held in Louisville on June 15.

About 150 companies, with 50,000 subscribers were represented. Subjects of importance to Independent interests were discussed and the delegates to the National Interstate Telephone Association were elected as follows: J. A. Armstrong, president, Louisville; H. S. Taylor, Lexington; J. W. Chambers, Winchester; R. T. Hickman, Henderson; M. J. Thomas, Shelbyville.

The new officers for the ensuing year are: M. B. Overly, president; H. K. Cole, Owensboro, secretary; M. J. Thomas, Shelbyville, vice-president first district; Frank M. Hoge, Hopkinsville, vice-president second district; M. S. Taylor, Lexington, vice-president third district; P. H. Murphy, Nicholasville, vice-president fourth district; J. W. Brambers, Winchester, treasurer.

SULLIVAN, INDIANA, REFUSES BELL GIFTS.

NOT long ago the Bell Telephone Company, as a means of fighting the vigorous competition which was found in Sullivan, Ind., built a new exchange and attempted to build up a large subscribers' list by giving free service. As a result of the efforts made by the company 85 people are receiving free service out of the total number of about 200 who are connected to this exchange. The business men of the town realized that the concessions by the Bell Company were made to overthrow competition and did not possess the feature of permanence. Wishing to secure the advantages of competition and valuable Independent connections to surrounding towns and rural lines, the Merchants Club and the Business Men's Association have both endorsed the service given by the Independent company, and members of these associations have agreed not to have a Bell telephone installed. The Independent company is growing rapidly, and now has 500 telephones, which is about one to every ten people. Toll connections are given to all important towns in Sullivan County.

STEADY INCREASE REPORTED BY THE FAYETTE HOME TELEPHONE COMPANY.

AFTER declaring a semi-annual dividend of 1½ per cent. on the common stock, the executive committee of the Fayette Home Telephone Company appropriated money for extensions due to the rapid growth of the company's business. New cable will be purchased to take care of the increasing demand for telephones in the eastern and southern section of the city, and a 200 pair cable will be strung as soon as it can be secured. Other cables smaller in dimension will also be installed within a short time to take care of new subscribers connected to lines in other parts of the city.

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THE EDITOR'S PAGE

ANOTHER TELEPHONE DISTURBANCE.

SOME time ago Boston had a most interesting case, in which a man had served upon his wife an injunction with the object of restraining her from calling him to the telephone many times a day to speak about trivial affairs. This was pretty bad, but now St. Louis bobs up with an affair that puts the old one so far back that it will soon be forgotten.

It seems that a certain resident of that city had a son-in-law who owed a young woman a debt. Apparently discouraged at the failure of ordinary methods of collection the young woman decided to reach the financially responsible member of the family by the means most convenient for repeated urging of her claims. So the telephone was called into service, and time after time during the day the receiver was lifted at the call from this same person until the dun had been repeated forty-four times.

By this time the father-in-law's condition may be imagined. Unfortunately for the young woman she had mistaken her man. When his endurance would stand the strain no longer he still would not give in. He called the police.

The young woman was arrested, and taken before the judge on a charge of disturbing the peace. It was held in the first court that the disturbance was proved, but the case has been appealed. Still, the young woman has probably learned that the telephone is an instrument of persuasion, not of force.

PREPARING FOR TOLL BUSINESS.

THE need of a thing is made evident in no more forcible way than by the presence of a partial supply. A few years ago when the Independent companies had no toll lines they accepted the lack as one of the conditions limiting their business. Now the cry is being raised nearly everywhere for more long distance connections.

The building of Independent long distance lines is being pushed forward now, with more or less vigor, in practically all sections of the country where the territory is locally well developed. Methods of assisting the progress of this work, and making the furnishing of first class toll service a substantial feature of the business is, in the present state of competition, a matter of the utmost importance to the Independent interests. It is only in this way that a telephone system may achieve its maximum usefulness in the eyes of the men having the larger business interests, whose support is of so much value both in an indirect and a direct financial sense.

When a local company seeks an outlet through the assistance of a toll line built by outside capital it is necessary to give convincing evidence that the line, shortly after it has been erected, will pay. The manager of the local company must be in a position to show that he has enough subscribers whose interests lead them to use toll lines to furnish each day the number of connections necessary to cover the cost of operation, maintenance, depreciation and other charges and a little more. This, however, is not all that is necessary. He must do more than show a field that is good, but undeveloped. It is essential that the building of the toll line should be merely the final preparatory step, coming as the result of a well formulated demand. This means that the manager of the local plant must be ready to show that his plant is capable of giving a satisfactory service when connection to the long distance lines is established. In other words, it may be predicted that, in the usual course of events, the toll line company will demand that in consideration of furnishing a satisfactory medium for transmitting conversations over long distances it shall be furnished with adequate and convenient terminal facilities.

These conditions, in the first place, call for a high standard of local transmission. To attain this result every local line must be designed with a view to keeping the transmission up to a point that will allow a sufficient margin for connections to the longest lines. This means, in an exchange where much cable is installed, that no lead should be placed without a careful study of transmitting efficiency in connection with costs, when choosing the proper size of conductors.

Another essential point which demands consideration in connection with a partially-installed toll system is due to the fact that in the present condition of affairs, switching through several local exchanges must be accomplished for many messages before connection between the toll line and the subscriber's instrument is finally established. This usually calls for special circuit arrangements in switchboards, in order to secure the elimination of all apparatus which would tend to cut down the effective talking current. A careful estimate of traffic requirements will enable any company to install at small expense a sufficient number of special circuits to care for this business in a way to secure good results. A secondary feature which should be taken up in connection with the determination of the number of special circuits to install in a given exchange, is the question of routing long distance messages. It is frequently the case that special routing instructions for long distance messages can be worked up in such a way as to keep a small number of circuits working at a much higher efficiency than could be obtained without a thorough examination of the possibilities in this line.

The third factor, and the one which probably involves the greatest expense directly chargeable to this special feature of the business, is the erection and maintenance of trunk lines between local exchanges. It is of little use to connect a well built toll line to a poorly constructed trunk, perhaps of iron wire run in a location where it is exposed to inductive disturbances set up by wires carrying heavy currents. A single attempt at conversation over such a circuit will usually be sufficient to destroy the confidence of the most loyal subscriber.

Reconstruction is an expensive process. There is sufficient capital available for the building of long distance lines between all points where a profit can be made from their operation. On account of its positive revenue increasing effect upon the local plant it seems to be agreed that the establishment of proper toll connections is one of the most important questions for the manager of the small plant to keep in view at the present time. From this time forward all building must be undertaken with the idea that the plant is, or soon will be, a part of a great telephone system, rather than a neighborhood convenience.

THE IMPETUS OF THE TELEPHONE MOVEMENT.

EXTREMELY interesting were the reports of the extraordinary rate of increase in the number of telephones which were brought in from all quarters by the delegates to the Chicago convention. It seems as if there is almost no class of business in which the telephone can be made not only useful, but useful in a special way, rapidly fitting into any scheme of organization or operation. Of course the secret of this lies in the fact that all the affairs in which men are engaged together demand communication, and the telephone reduces the time for such communication to a minimum.

All estimates for business have been overrun for several years, and it looks as if this year would be far the greatest of them all.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

OPERATORS' WAGES HAVE PRIORITY.

Have the operators of a telephone company any priority in getting their wages paid over the mortgage indebtedness of the company? We are in difficulties financially and if we can convince our operators of their prior rights to their pay they will stay with us and we can run until money is easier and thus weather the storm. Do not use our name, please.

IN the federal courts the claims of those furnishing labor or supplies necessary to keep a railroad a "going concern" are recognized as entitled to priority of payment over its mortgage indebtedness. On the theory that telephone and telegraph companies are important instruments of interstate commerce and are of the most essential importance to the government in time of war and to the people in time of peace, the same rule has been applied to the operators of such companies also. In the case so decided the court said of the operators. "They clung to their position and stood by the corporation, in despite of failure to secure pay. They, at a great sacrifice, kept it a living concern. They enabled it to retain its list of subscribers, so that when it was offered for sale, instead of being an abandoned wreck, it was in active daily operation." Keelyn v. Carolina Mut. Telep. & Teleg. Co., 90 fed. 29.

LICENSE IRREVOCABLE AFTER EXPENDITURE IN RELIANCE THEREON.

Under date of June 9th you state that verbal license is irrevocable after a party has expended a considerable sum of money in erecting a pole line and other labor under such promise. Will you kindly give reference to decisions in New York courts holding that such license is irrevocable after the building of line under those conditions? C. C.

A LEADING case on this subject which establishes the rule but does not involve a telephone company is Le Fevre v. Le Fevre, 4 Serg. & R. 241; 8 Amer. Dec. 696. Another case that establishes the right very clearly is Wilson v. Chalfant, 15 Ohio 248, 45 Amer. Dec. 574. New York cases referring to the subject are Rindge v. Baker, 57 N. Y. 204; Smith v. Benson, 1 Hill (N. Y.) 176. Other cases can be found in the brief for appellant in Western Union Telegraph Co. v. Pennsylvania Co., 68 L. R. A., 968; 129 Fed. 849.

LOUISVILLE FRANCHISE TAX SET ASIDE.

THE Court of Appeals of Kentucky has reversed a judgment of the Jefferson County Circuit Court in a case of the Ohio Valley Telephone Company v. the City of Louisville. In reversing the lower court's judgment, the Court of Appeals held that the franchise taxing act of November, 1892, requiring the payment of an annual franchise tax to the state, and a local tax to cities and counties, was not intended to be retrospective but prospective only in operation, and that the city of Louisville could not recover the sum sued for, aggregating $2,500 from the telephone company for the year 1892, on an assessment made in June, 1898. It was contended by the city that on the first day of September, 1892, at which time the assessment of property for municipal purposes is constructively made, there was not a law in existence for the assessment of a franchise tax; but that on the eleventh day of November, 1892, the general assembly of the commonwealth enacted a statute for the assessment of franchises, which provides that every telephone company shall, in addition to other taxes imposed annually pay a tax on its franchise to the state, and a local tax to the county, incorporated city, town and taxing district. After the enactment of this statute, the franchise of the company was assessed by the proper board and certified to by the clerk of Jefferson County. Under an ordinance enacted by the city of Louisville, the assessor issued a tax bill in June, 1898. The court considered the question before it as one of power only, being whether the statute authorized a retrospective assessment of the company's franchise. The court found nothing in the act of the legislature which indicated that it was intended to be retrospective, but considered its phraseology to show beyond question that it was intended to be prospective in its operation.

Ohio Valley Telephone Co. v. City of Louisville, to be reported in Southwestern Reporter.

PLAINTIFF'S STATUS AS GROUNDMAN OR LINEMAN IMMATERIAL IN DAMAGE SUIT.

A YOUNG man in the employ of a telephone company as "groundman" claimed to have been sent by his foreman to clear some trouble which had occurred at a certain point in the company's lines. When he arrived at the place, the lineman, whose assistant he claimed to have been, ordered him to climb the pole and remedy the trouble. In pursuance of this direction he climbed the pole and undertook to straighten out the telephone wires which had been so crossed and while so engaged a wire broke and fell across a trolley wire. Becoming thus highly charged with electricity, and coming in contact with his arm and hand, it gave him a severe shock, and burned his arm and fingers severely. He commenced suit, alleging that the wire which broke had been worn, rusted and weakened, and was not properly insulated. The evidence showed that he was beginning to climb telephone poles and perform other like duties incident to becoming a lineman, which is a higher employment than a groundman. He recovered judgment of $600, which the company sought to have reversed on the ground that at the time of the accident he was a groundman and not a lineman and because the verdict was excessive. The court held that this was an insufficient reason for a reversal, because whether he was called a lineman or a groundman did not alter his right to recover if he was on the pole at the time of his injury in performance of a duty owed to the company and not as a mere volunteer. The court held that the verdict was not excessive and refused to reverse it. Cumberland Telep. & Teleg. Co. v. Adams, 91 S. W. 739.

TELEPHONE EMPLOYEES ON STRIKE ENJOINED.

AT St. Paul, Minn., an injunction has been granted to the Tri-State Telephone Company restraining Minneapolis local unions 21 and 24 of the Brotherhood of Electrical Workers, from interfering in any manner with the property of the company or its employees. The judge in his decision stated that while the unions had a right to persuade men to join their ranks and keep up their organization in that manner, they had no right to destroy property, and while the evidence did not make specific accusations, it would be proper to give an injunction. The representatives of the unions contended that the bill of complaint of the company was lacking in specific evidence and that the two local telephone companies were confederated so far as the strike was concerned. They claimed that these companies had an agreement as a result of which damage to telephone property was done for the purpose of injuring the unions in the minds of the court and the public and produced evidence to substantiate their statements, but without effect.

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THE need of a thing is made evident in no more forcible way than by the presence of a partial supply. A few years ago when the Independent companies had no toll lines they accepted the lack as one of the conditions limiting their business. Now the cry is being raised nearly everywhere for more long distance connections.

The building of Independent long distance lines is being pushed forward now, with more or less vigor, in practically all sections of the country where the territory is locally well developed. Methods of assisting the progress of this work, and making the furnishing of first class toll service a substantial feature of the business is, in the present state of competition, a matter of the utmost importance to the Independent interests. It is only in this way that a telephone system may achieve its maximum usefulness in the eyes of the men having the larger business interests, whose support is of so much value both in an indirect and a direct financial sense.

When a local company seeks an outlet through the assistance of a toll line built by outside capital it is necessary to give convincing evidence that the line, shortly after it has been erected, will pay. The manager of the local company must be in a position to show that he has enough subscribers whose interests lead them to use toll lines to furnish each day the number of connections necessary to cover the cost of operation, maintenance, depreciation and other charges and a little more. This, however, is not all that is necessary. He must do more than show a field that is good, but undeveloped. It is essential that the building of the toll line should be merely the final preparatory step, coming as the result of a well formulated demand. This means that the manager of the local plant must be ready to show that his plant is capable of giving a satisfactory service when connection to the long distance lines is established. In other words, it may be predicted that, in the usual course of events, the toll line company will demand that in consideration of furnishing a satisfactory medium for transmitting conversations over long distances it shall be furnished with adequate and convenient terminal facilities.

These conditions, in the first place, call for a high standard of local transmission. To attain this result every local line must be designed with a view to keeping the transmission up to a point that will allow a sufficient margin for connections to the longest lines. This means, in an exchange where much cable is installed, that no lead should be placed without a careful study of transmitting efficiency in connection with costs, when choosing the proper size of conductors.

Another essential point which demands consideration in connection with a partially-installed toll system is due to the fact that in the present condition of affairs, switching through several local exchanges must be accomplished for many messages before connection between the toll line and the subscriber's instrument is finally established. This usually calls for special circuit arrangements in switchboards, in order to secure the elimination of all apparatus which would tend to cut down the effective talking current. A careful estimate of traffic requirements will enable any company to install at small expense a sufficient number of special circuits to care for this business in a way to secure good results. A secondary feature which should be taken up in connection with the determination of the number of special circuits to install in a given exchange, is the question of routing long distance messages. It is frequently the case that special routing instructions for long distance messages can be worked up in such a way as to keep a small number of circuits working at a much higher efficiency than could be obtained without a thorough examination of the possibilities in this line.

The third factor, and the one which probably involves the greatest expense directly chargeable to this special feature of the business, is the erection and maintenance of trunk lines between local exchanges. It is of little use to connect a well built toll line to a poorly constructed trunk, perhaps of iron wire run in a location where it is exposed to inductive disturbances set up by wires carrying heavy currents. A single attempt at conversation over such a circuit will usually be sufficient to destroy the confidence of the most loyal subscriber.

Reconstruction is an expensive process. There is sufficient capital available for the building of long distance lines between all points where a profit can be made from their operation. On account of its positive revenue increasing effect upon the local plant it seems to be agreed that the establishment of proper toll connections is one of the most important questions for the manager of the small plant to keep in view at the present time. From this time forward all building must be undertaken with the idea that the plant is, or soon will be, a part of a great telephone system, rather than a neighborhood convenience.

THE IMPETUS OF THE TELEPHONE MOVEMENT.

EXTREMELY interesting were the reports of the extraordinary rate of increase in the number of telephones which were brought in from all quarters by the delegates to the Chicago convention. It seems as if there is almost no class of business in which the telephone can be made not only useful, but useful in a special way, rapidly fitting into any scheme of organization or operation. Of course the secret of this lies in the fact that all the affairs in which men are engaged together demand communication, and the telephone reduces the time for such communication to a minimum.

All estimates for business have been overrun for several years, and it looks as if this year would be far the greatest of them all.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

OPERATORS' WAGES HAVE PRIORITY.

Have the operators of a telephone company any priority in getting their wages paid over the mortgage indebtedness of the company? We are in difficulties financially and if we can convince our operators of their prior rights to their pay they will stay with us and we can run until money is easier and thus weather the storm. Do not use our name, please.

IN the federal courts the claims of those furnishing labor or supplies necessary to keep a railroad a "going concern" are recognized as entitled to priority of payment over its mortgage indebtedness. On the theory that telephone and telegraph companies are important instruments of interstate commerce and are of the most essential importance to the government in time of war and to the people in time of peace, the same rule has been applied to the operators of such companies also. In the case so decided the court said of the operators. "They clung to their position and stood by the corporation, in despite of failure to secure pay. They, at a great sacrifice, kept it a living concern. They enabled it to retain its list of subscribers, so that when it was offered for sale, instead of being an abandoned wreck, it was in active daily operation." Keelyn v. Carolina Mut. Telep. & Teleg. Co., 90 fed. 29.

LICENSE IRREVOCABLE AFTER EXPENDITURE IN RELIANCE THEREON.

Under date of June 9th you state that verbal license is irrevocable after a party has expended a considerable sum of money in erecting a pole line and other labor under such promise. Will you kindly give reference to decisions in New York courts holding that such license is irrevocable after the building of line under those conditions? C. C.

A LEADING case on this subject which establishes the rule but does not involve a telephone company is Le Fevre v. Le Fevre, 4 Serg. & R. 241; 8 Amer. Dec. 696. Another case that establishes the right very clearly is Wilson v. Chalfant, 15 Ohio 248, 45 Amer. Dec. 574. New York cases referring to the subject are Rindge v. Baker, 57 N. Y. 204; Smith v. Benson, 1 Hill (N. Y.) 176. Other cases can be found in the brief for appellant in Western Union Telegraph Co. v. Pennsylvania Co., 68 L. R. A., 968; 129 Fed. 849.

LOUISVILLE FRANCHISE TAX SET ASIDE.

THE Court of Appeals of Kentucky has reversed a judgment of the Jefferson County Circuit Court in a case of the Ohio Valley Telephone Company v. the City of Louisville. In reversing the lower court's judgment, the Court of Appeals held that the franchise taxing act of November, 1892, requiring the payment of an annual franchise tax to the state, and a local tax to cities and counties, was not intended to be retrospective but prospective only in operation, and that the city of Louisville could not recover the sum sued for, aggregating $2,500 from the telephone company for the year 1892, on an assessment made in June, 1898. It was contended by the city that on the first day of September, 1892, at which time the assessment of property for municipal purposes is constructively made, there was not a law in existence for the assessment of a franchise tax; but that on the eleventh day of November, 1892, the general assembly of the commonwealth enacted a statute for the assessment of franchises, which provides that every telephone company shall, in addition to other taxes imposed annually pay a tax on its franchise to the state, and a local tax to the county, incorporated city, town and taxing district. After the enactment of this statute, the franchise of the company was assessed by the proper board and certified to by the clerk of Jefferson County. Under an ordinance enacted by the city of Louisville, the assessor issued a tax bill in June, 1898. The court considered the question before it as one of power only, being whether the statute authorized a retrospective assessment of the company's franchise. The court found nothing in the act of the legislature which indicated that it was intended to be retrospective, but considered its phraseology to show beyond question that it was intended to be prospective in its operation.

Ohio Valley Telephone Co. v. City of Louisville, to be reported in Southwestern Reporter.

PLAINTIFF'S STATUS AS GROUNDMAN OR LINEMAN IMMATERIAL IN DAMAGE SUIT.

A YOUNG man in the employ of a telephone company as "groundman" claimed to have been sent by his foreman to clear some trouble which had occurred at a certain point in the company's lines. When he arrived at the place, the lineman, whose assistant he claimed to have been, ordered him to climb the pole and remedy the trouble. In pursuance of this direction he climbed the pole and undertook to straighten out the telephone wires which had been so crossed and while so engaged a wire broke and fell across a trolley wire. Becoming thus highly charged with electricity, and coming in contact with his arm and hand, it gave him a severe shock, and burned his arm and fingers severely. He commenced suit, alleging that the wire which broke had been worn, rusted and weakened, and was not properly insulated. The evidence showed that he was beginning to climb telephone poles and perform other like duties incident to becoming a lineman, which is a higher employment than a groundman. He recovered judgment of $600, which the company sought to have reversed on the ground that at the time of the accident he was a groundman and not a lineman and because the verdict was excessive. The court held that this was an insufficient reason for a reversal, because whether he was called a lineman or a groundman did not alter his right to recover if he was on the pole at the time of his injury in performance of a duty owed to the company and not as a mere volunteer. The court held that the verdict was not excessive and refused to reverse it. Cumberland Telep. & Teleg. Co. v. Adams, 91 S. W. 739.

TELEPHONE EMPLOYEES ON STRIKE ENJOINED.

AT St. Paul, Minn., an injunction has been granted to the Tri-State Telephone Company restraining Minneapolis local unions 21 and 24 of the Brotherhood of Electrical Workers, from interfering in any manner with the property of the company or its employees. The judge in his decision stated that while the unions had a right to persuade men to join their ranks and keep up their organization in that manner, they had no right to destroy property, and while the evidence did not make specific accusations, it would be proper to give an injunction. The representatives of the unions contended that the bill of complaint of the company was lacking in specific evidence and that the two local telephone companies were confederated so far as the strike was concerned. They claimed that these companies had an agreement as a result of which damage to telephone property was done for the purpose of injuring the unions in the minds of the court and the public and produced evidence to substantiate their statements, but without effect.

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QUERIES

VOLTAGE FOR RINGING MOTOR.—(719.)

In our exchange we intend to use two ringing machines to give current for selective ringing. One will be connected to the exchange battery and used in case of the breaking down of the regular source of power; and the other will be connected to either a 500 volt direct current circuit, or a 104 single phase alternating current. This will be the machine which will furnish the ringing current. We are anxious to use the current which will give the best results. Can you tells us which it will be better to select?

A case of this sort is determined wholly by local circumstances. It is essential that your ringing machine should be kept running constantly and at an even speed during the time which you wish to run it. This is the first consideration, and it will therefore be necessary to find out which circuit is least liable to interruptions or variations. If your alternating current circuit is furnished by a machine which is self regulating it is likely that this will give the better results. An important advantage in its use is that no current of sufficient voltage to give dangerous shocks will be introduced in connection with the ringing machine if this is used. Moreover the connection of an induction motor to the circuit gives you a reliable machine in which there are no brushes to adjust, and no commutators to require constant and careful attention. If, however, this circuit is liable to interruptions it would be better to use the 500 volt circuit, provided the latter is free from such troubles.

USE OF A REPEATING COIL.—(720.)

In our exchange we have two grounded lines, all the rest of a large number of circuits being full metallic. We have quite a number of parties on these lines, and they are long, so we do not wish, on account of the expense, to make them metallic at this time. As, however, we find it necessary to use a repeating coil in connecting them to metallic circuits we have cut a coil in on each line, and connected the switchboard side to the jack by a metallic circuit. We find that this gives a good deal of trouble, the bells especially being hard to ring, although with the coil cut out they sound very distinctly. Please advise us if there is any plan we may use to improve this condition. What repeating coil is best? R. L. S.

Answering your last question first; we think that it is quite probable that whatever repeating coil you have, if not defective

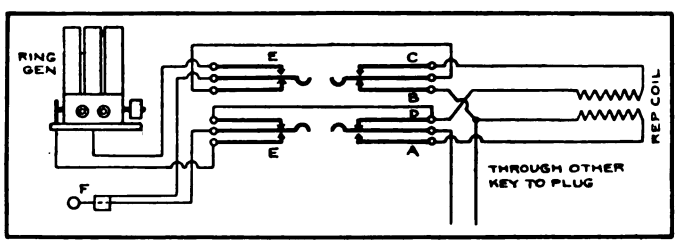

Fig. 720.

in its windings, will do your work satisfactorily. The difficulty is rather in the method of connecting. Where many bells must be rung on a line the use of a repeating coil cuts down the ringing current to such an extent as to cause serious difficulty. The only way in which this has been satisfactorily avoided is by using a repeating coil in the cord circuit. If you have only two grounded lines this will be a little more expensive than the mere connecting of the coils into the line, but you will be able to give good service.

Fig. 720 shows the connection of a repeating coil to a two-way key of the locking type properly arranged for your purpose. It will be observed that the ringing generator is connected to the springs at E, while to the middle springs at this end of the key is connected the pair of wires leading to the cord and plug F; throwing the key to bring these springs into operation rings direct upon the line. Of course it is essential that the generator should be grounded, and that the line should be connected to the jack in such a way as to have the ungrounded side of the generator connected to the line when ringing. When it is desired to cut in the repeating coil for talking all that is necessary is to throw the key in the reverse direction. It will be seen that this cuts one side of the coil across springs C and D, while the other side is bridged across A and B, and the connection between the tip springs and ring springs of the respective plugs is broken. In this way the only connection between the two lines is an inductive one through the windings of the repeating coil, which is the condition desired. It will be observed that this is an extra key, so that the total cost of this arrangement is that of installing this key in addition to the repeating coils.

DUTIES OF SUPERVISOR.—(721.)

Will you please explain to me the duties of a supervisor in a telephone exchange? N. B. R.

In a large exchange the supervisor is the person in direct charge of a group of operators, usually consisting of nine persons. Her station is back of the operators as they sit at the board, and she walks up and down the line to watch the business. It is her duty to see that the operators are handling their cords properly, with due attention to the line and supervisory signals; that they are comfortably seated, and that the apparatus is properly adjusted. Her special field of usefulness is in looking after the distribution of calls, to enable the highest grade of team work to be accomplished. If an operator is overloaded the supervisor is supposed to note the fact immediately, and request the operator at the adjacent position to help out by taking some of the calls which come in front of the exceptionally busy operator. In this way she assists in keeping the operating at its most effective pitch.

An additional function is to assist the chief operator in locating disconnections and similar difficulties which arise in the course of a days' work, and to handle any other matters which will aid in making the operating force as comfortable as possible, and its work accurate and efficient.

RINGING ON A GROUNDED LINE.—(722.)

We have a long grounded line, and have difficulty in ringing two instruments near the end. As these instruments are on a branch, and other instruments are considerably farther away from the office, we have been unable to explain the trouble, especially as the talking from the two instruments where the trouble has been experienced is not bad. Can you give us any reason for the difficulty? N. R.

There are several conditions which might produce the difficulty of which you speak. Of course the most obvious one is a poor ground. In this case the high potential voice currents will pass over the line, and conversation, although weak, will be intelligible, owing to the extreme sensitiveness of the telephone receiver. With the bells, however, the case is different; the current upon the line must reach a very large value in order to cause the ringers to sound, and if there is a high resistance in the ground this is impossible. If you have not the very best ground connection one should be made. In any event the ground should be inspected and tested. By taking a battery and telephone connected in series, and bridged between the ground post of the instrument and pipe or rod which furnishes the ground, you can make an electrical test, which will show you if the ground wire and its connection to the pipe or rod are perfect. A click in the receiver will indicate a poor joint. If the line is made of iron wire the trouble may be due to a slightly loose connection. In this case about the only way to make sure, if you have not accurate testing instruments in your exchange, is by going over the line and inspecting each joint, moving it about when bridged with a receiver and battery, if necessary, to determine whether the splice is electrically perfect. In this case also the voice current is extremely likely to pass where the ringing current will be so cut down as to be ineffective.

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IN THE OPERATING FIELD

PRESSURE FOR INDEPENDENT CONNECTIONS BEING EXERTED IN VICINITY OF OSWEGO.

THE situation created by the selling out of the Ontario Telephone Company to the Bell Company has caused a disturbance which extends beyond the borders of the city of Oswego, N. Y. At Mexico the subscribers of the Ontario Company have held a mass meeting because they were forced to receive Bell service, and are anxious to see Independent connections restored. Subscribers to Independent companies in other towns which have been in the habit of reaching Syracuse over the lines of the Ontario Company are expecting difficulties, and they, too, are getting ready to make a protest. The Independent development in this section of New York State is so strong that the interests of any town which has no means of connecting with subscribers of Independent systems in other towns are seriously handicapped, and it is believed that the people of Oswego will not endure such a state of affairs for any considerable length of time.

NEW EQUIPMENT IN SERVICE AT STREATOR, ILL.

RECENTLY the Independent Telephone Company at Streator held an informal reception at its new office building, which was attended by a great many interested subscribers and friends of the company. The new building is a one story fireproof structure of brick, and was erected especially for the telephone company. On the main floor the front part of the building is given up to the manager's office, while in the rear is the operating room, containing a new central energy switchboard, where nine operators are engaged in handling the business of the 1,560 city and 300 country subscribers now connected to the company's lines. Owing to the approach of these changes the company has been compelled to hold up a considerable number of orders, but it is expected that a rapid increase in the amount of subscribers will soon take place. Every effort has been made to complete the necessary arrangements for giving the best possible service, and the support of the citizens of the town is fully assured to the company.

INDEPENDENT COMPANY TO ERECT MODERN BUILDING IN TACOMA.

PLANS have been completed for a modern telephone building to be erected at Tacoma, Wash., by the Home Telephone Company of Portland.

The plans provide for a three-story structure of reinforced concrete, faced with Roman pressed brick and cut stone trimmings. The building will cost $200,000. It will be as near fireproof as modern designing can make it, and will be equipped with every convenience for the rapid and comfortable transaction of business. The exchange is to have a capacity of 10,000 subscribers.

INDEPENDENTS FIND GENERAL SITUATION VERY SATISFACTORY IN INDIANA.

INDEPENDENT telephone conditions in Indiana are the most encouraging for years. In addition to new companies forming to occupy vacant territory existing companies are doing well and are increasing the facilities of their exchanges and extending lines in all directions. Never before have the Independent companies co-operated so harmoniously as now and all the territory lost to the Bell company is being rapidly reclaimed by the establishment of new competing systems. During the past week steps were taken to organize a new company at Shelbyville to construct a modern system in that city and county. The promoters are Indianapolis and Lafayette men and are meeting with every encouragement. The council has expressed a willingness to grant a franchise, and it is only a matter of a short time until the Independents will be in the lead in Shelbyville again. The new company will have the support of the neighboring rural companies, which cut off connections with the old company as soon as it passed into control of the Bell interests.

INDEPENDENT OPERATORS IN MAINE ORGANIZE ASSOCIATION.

RECENTLY representatives of Independent telephone companies in Maine met at Portland and formed an organization to co-operate with the National-Interstate Telephone Association.

W. H. Clark, of Portland, was elected president, and H. L. Davis, recently of Cleveland but now located in Portland, was made secretary and treasurer. The state was divided into thirteen districts, and a vice-president elected from each, as follows: W. H. Lurvey, West Paris; H. L. Robbins, Union; H. L. Sawyer, Greenville; F. L. Ames, Norridgewock; James T. Collins, Manchester; C. P. Chandler, New Gloucester; H. B. Hartford, Standish; Willis R. Dresser, Houlton; W. W. Blake, Monmouth; G. B. Turner, East Otisfield; Dr. Brehant, Calais; Elmer E. Deasy, Lewiston; E. L. Durgan, Auburn and Portland. The new association was represented by delegates to the National-Interstate Convention at Chicago.

This organization will strengthen the relations between Independent operators in Maine, who have heretofore been fighting almost singly against the most vigorous competition, and is expected to be an important aid to the progress of the several Independent systems which have been operating separately. The first annual meeting of the Association will be held in Lewiston on August 8th; it is desired that all men in the state connected with independent plants shall be present at that time.

MEETING OF INDEPENDENT OFFICIALS AT POMONA, CAL.

OFFICIALS representing the various Independent telephone companies of Southern California recently met at Pomona.

Two papers were read; one by A. L. Orton, of Pasadena, on "The Manager and the Practical Working of the Operating Room," and another by O. S. Parker, of Pomona, on "The Public Value of the Independent Telephone Movement."

A good attendance of prominent telephone men made the meeting interesting and useful.

CANADIAN INDEPENDENTS REPRESENTED AT THE CONVENTION.

AMONG the visitors to the Convention were F. S. Jones, of Fort William, Ontario, superintendent of the Fort William Corporation Telephone Commission, and Mr. Delbridge of Port Arthur, Ontario, superintendent of the Port Arthur Municipal Telephone Department, representing probably the most successful Independent telephone systems in Canada.

The corporations of Port Arthur and Fort William established a public service telephone system in opposition to the Canadian Bell company about four years ago, beginning the service with 200 subscribers in each town in opposition to about 150 in each town of the Bell telephones.

At the present time, each town has about 750 subscribers against the Bell company's practically none, excepting those installed free.

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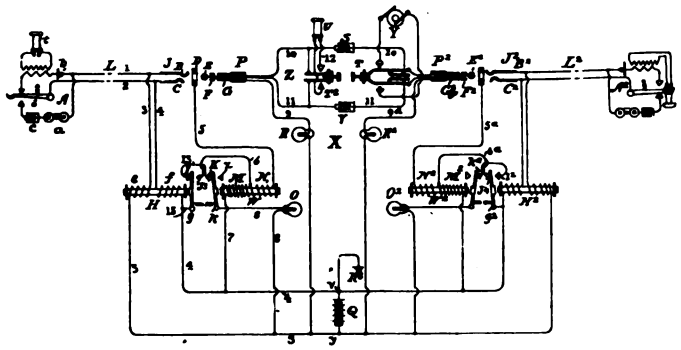
TELEPHONE PATENTS

TELEPHONE SYSTEM.

Charles I. Boyce, Detroit, Mich., patents and assigns to the American Telephone & Telegraph Company, New York, N. Y. (No. 820,176; dated May 8th, 1906; filed March 7th, 1902; serial No. 97,025) an improvement in telephone systems.

This invention relates to an improved plan for the operation and control of line and supervisory signals in a common battery exchange. Its purposes are to insure control of the exchange signals in accordance with the established system of operating; to dispense with relays in the main circuit conductors of the switch cord; to control the supervisory signals without the employment of shunt circuits, and to provide an arrangement in which all relays concerned in operating the call and supervisory signals shall be associated with the line circuit.

As shown in the accompanying diagram, the helices of the line relays are divided into two equal divisions, which are connected between the two sides of the line and the two poles of the battery respectively. These coils not only serve to control the operation of the relays, but also as impedance coils through



which the current is supplied to the transmitter at the subscriber's station. At the sub-station the usual signalling circuit containing a condenser and bell in series, and the talking circuit employing an induction coil are provided.

Connected with line L^2 in the diagram is a station in the condition found when no one is talking, and when it is capable of receiving a signal in the usual manner. It will be observed that while the battery is permanently connected to the line through windings of relay H^2 the circuit is not closed and the relay is not actuated. The armature is retained in connection with the back contact through the action of a suitable controlling spring or other device. Upon the removal of the receiver from the hook at the subscriber's station the condition is as represented at station A and the apparatus connected to line L. The current flowing from battery Q through windings of relay H excites and causes this relay to attract its armature *g*, thus closing through contact I, armature K and line signal O a circuit which includes the battery Q, illuminating the line lamp. Upon receipt of the signal the operator inserts plug P in jack J to ascertain the wishes of the subscriber. In so doing she energizes relay W by current flowing from pole Y of battery Q, through supervisory signal R, sleeves D through windings N and M of relay W in series, back to grounded side of the battery. The relay W is so constructed that winding M is of high resistance, and primarily inserted not on account of its value in operating the relay but to provide resistance in the supervisory circuit. The including of this high resistance prevents the passage of sufficient current to operate the supervisory signal. When the circuit is completed through relay W it attracts its armature, breaking the circuit through the line signal O at the contact K, and this signal is therefore extinguished.

When the operator inserts the plug P^2 in jack J^2 and calls the subscriber A^2, the circuit is completed from pole Y of battery Q through supervisory signal R^2, sleeve of the plug and jack, low resistance winding N^2 of relay W^2, wire 6a, armature G^2 of relay H^2 to the grounded side of the battery. When the low resistance winding is in series with the supervisory lamp it is illuminated and remains in this condition until the attraction of armature of relay H^2, due to the completion of the metallic circuit through substation A^2, breaks the circuit through the low resistance path, shunting the relay winding N^2. This, of course, puts the entire resistance of relay W^2 in series with lamp R^2, causing it to be extinguished. The two lines are now connected through the cord circuit, which employs the usual talking and ringing keys, with the local circuits which are used with this apparatus. Transmission is effected through the condensers S and V. It will be observed that there are no relays in the talking strands of the cord circuit, which are therefore perfectly balanced. Upon the hanging up of the receiver of either subscriber at the end of a conversation the corresponding line relay is de-energized, and when its armature falls back it establishes a short circuit about the high resistance winding of the auxiliary relay included in the sleeve circuit of the jack, thus permitting the illumination of the corresponding supervisory signal, which gives the operator the notification that disconnection is desired.

AUTOMATIC EXCHANGE SELECTOR.

Claude D. Enochs, La Crosse, Wis., patents (No. 820,187; dated May 8, 1906; filed October 16, 1905; serial No. 282,985), and assigns to the Western Electric Company, Chicago, Ill., an automatic exchange selector.

This invention relates to a selector for automatic telephone exchanges, and has for its object the simplification of a certain type of mechanism for effecting the interconnection of the different lines terminating at a central exchange.

For this purpose there is provided a selecting mechanism in which but one magnet is used. This magnet is provided with two armatures, one carrying the stepping-pawl and the other controlling the retaining-pawl. The former is arranged to respond to each interruption of the current through the magnet, so that the stepping-pawl is actuated once for each impulse of current through the magnet, while the other armature is constructed so as to respond only to interruptions of longer duration and to remain attracted during the process of selection as well as when the current is constant. By this arrangement the usual retaining-magnet is dispensed with thereby simplifying the selector mechanism.

SELECTIVE SYSTEM.

Noble S. McKinsey and Anton R. Nelson, Susanville, Cal., patent (No. 820,063; dated May 8, 1906; filed June 15, 1904; serial No. 212,648) a selective telephone system.

This invention relates to selective telephone systems and discloses means for selectively establishing communication between subscribers on a party line without the use of an exchange and also for preventing other parties on the same line from listening in upon a connection. The means involved are very complicated, requiring twelve separate drawings, and the sub-division of the description of the apparatus and its use into seven distinct parts, each of which relates to a single operation.

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WANTED—A man for "noisy line" work by a large telephone company. Must be able to inspect, recommend and to supervise the erection of any remedy recommended for elimination of noise on toll lines. Must be competent to successfully deal with any noisy line condition. Address Box 635, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 635

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

LOSSES FROM LACK OF PROTECTION.

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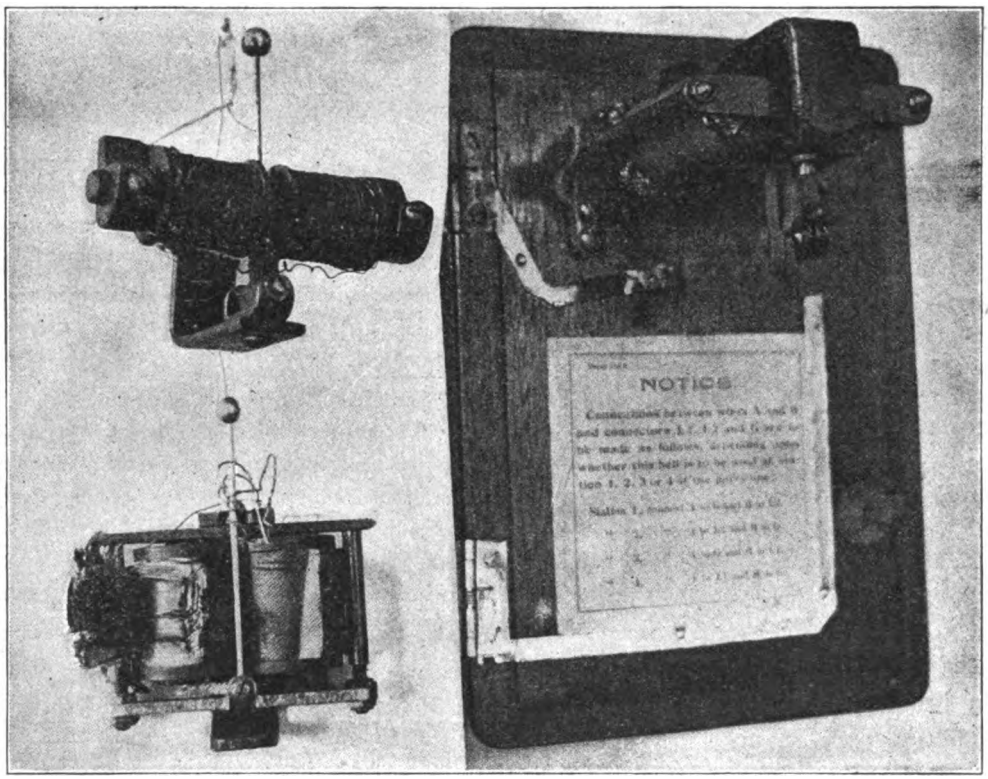

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" Mistakes.....?	**Knows**
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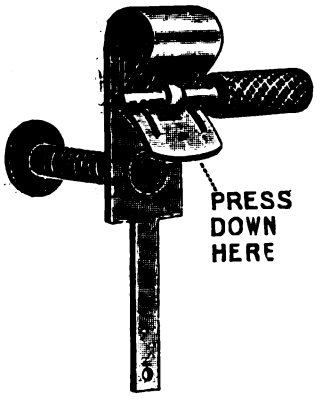

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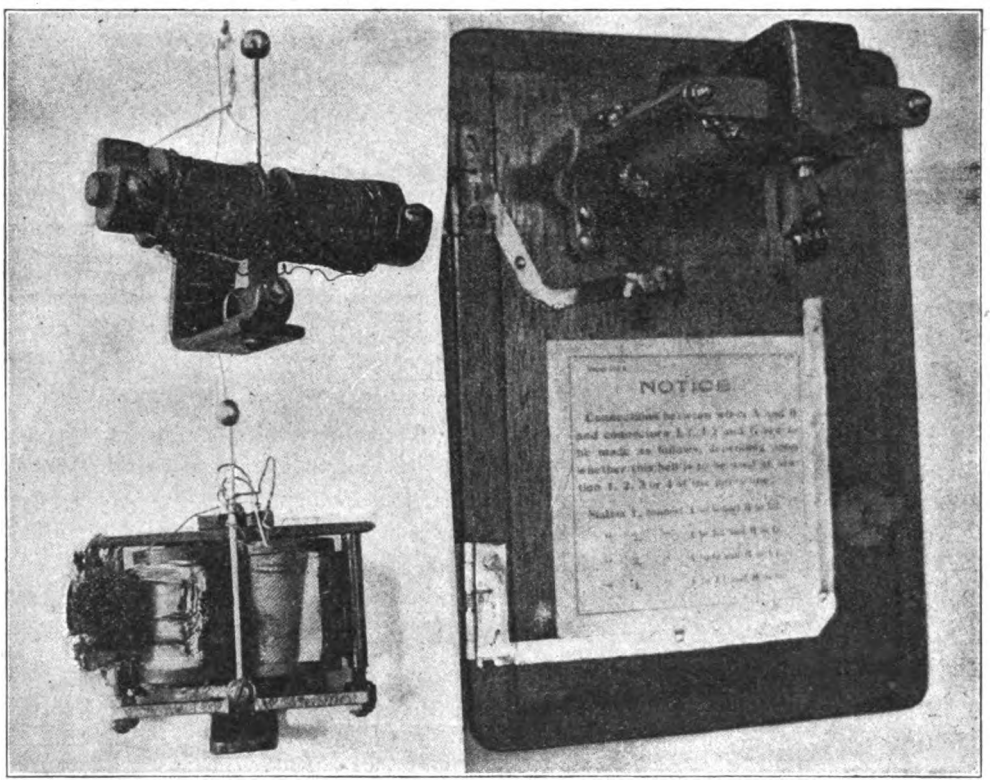

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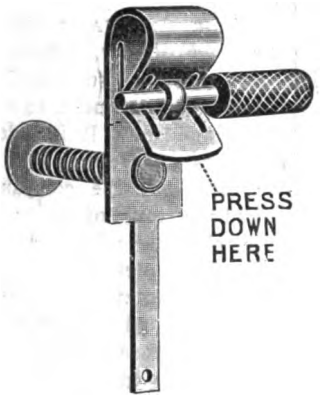

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The National cash register is a great improvement over the old cash drawer. It not only receives and divides the money, but it counts, records, issues a cash ticket, and keeps a correct and just account of all sales during the day, and these improvements are of such importance that almost every up-to-date business house will not be without it.

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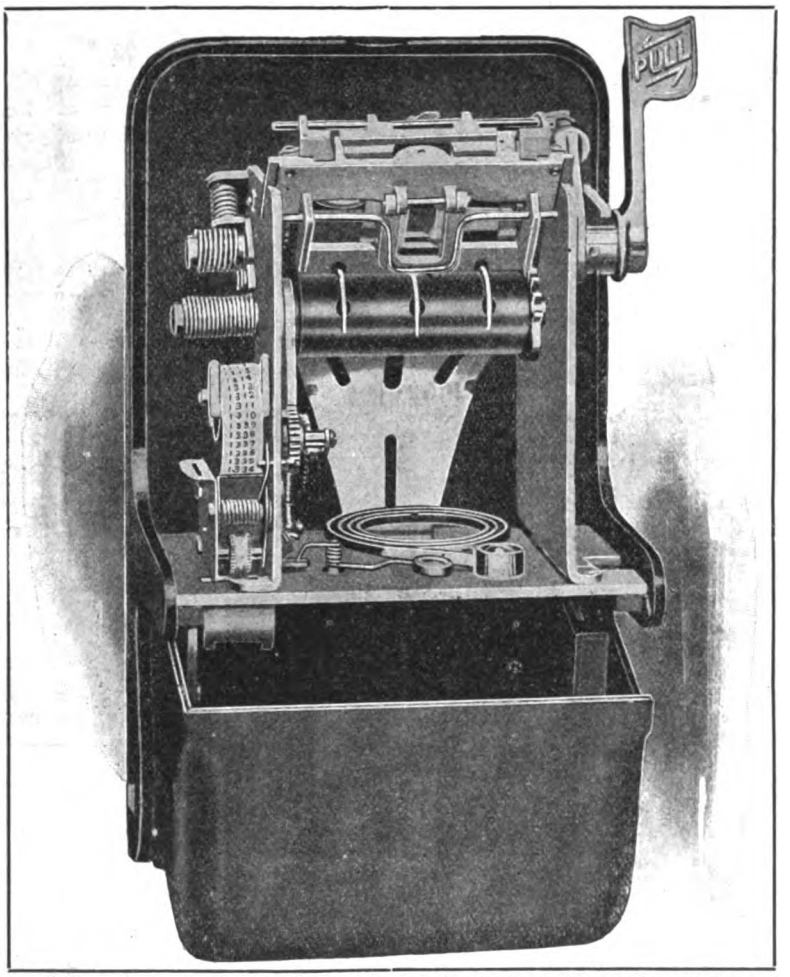

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At every blow of the gong the tape moves one number into the cash box; one blow for 5 cents, two blows for 10 cents, and five blows for 25 cents. The box being opened by the collector automatically cuts off the tape at the last number recorded. The total number of impressions on this piece of tape, multiplied by 5, must be the correct amount of the collection, and is taken to the auditor with the money. The tape is then filed to be retained until the next collection. The piece of tape from the next collection must start to number where the last piece of tape filed was cut off, and so on until the tape is fully used.

This system is said to avoid all errors, thefts, disputes and trouble, and systematizes the work of pay station accounting in a most satisfactory manner.

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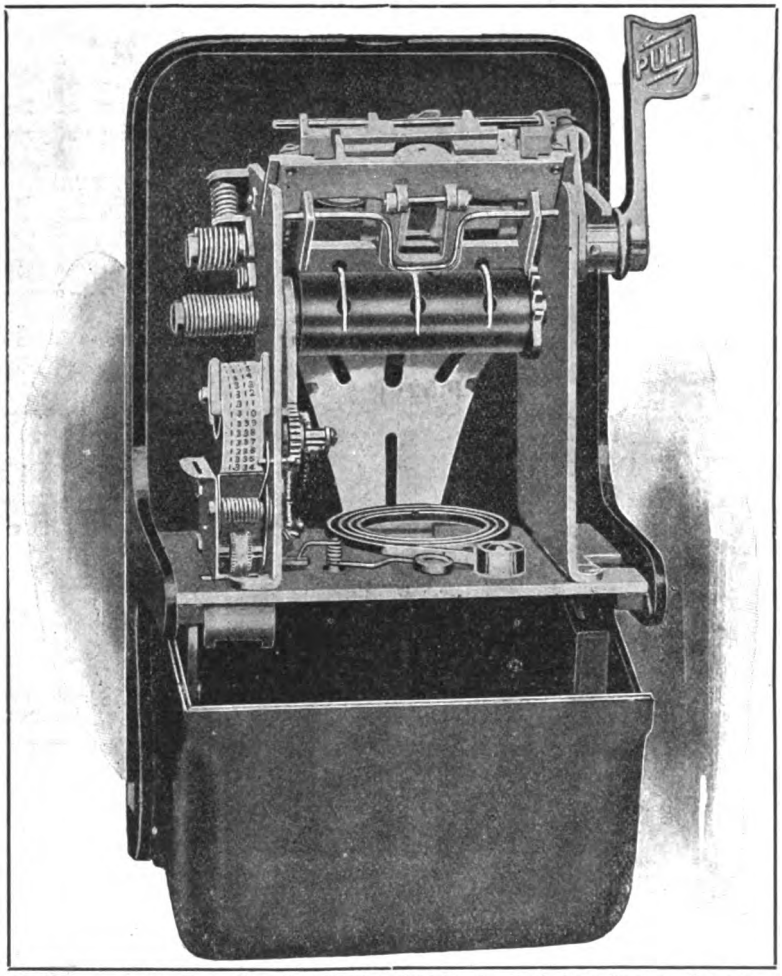

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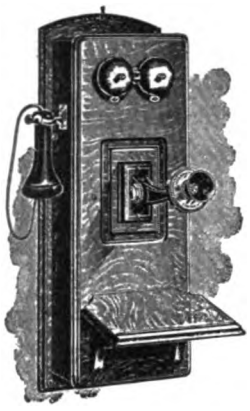

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CHEAP VS. EFFICIENT SERVICE

The cheapest telephone service in the world is dear at any price if it is not efficient.

When a man installs a telephone he wants to be able to use it and not to abuse it.

A grounded line nine times out of ten is noisy, and foreign noise on a telephone line will arouse a feeling of anger in the heart of the user that isn't good for the company. You can keep your lines free from grounds and other troubles by periodic tests with a Pignolet voltmeter, and when they do occur, you can locate them with this instrument, and get them cleared often before the subscriber knew his line was in trouble.

If you need your subscribers' good will, you need my voltmeter to get it.

LOUIS M. PIGNOLET, Originator of the Voltmeter Habit

78 CORTLANDT ST., N. Y.

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THE W. G. NAGEL ELECTRIC COMPANY, Toledo, Ohio, has recently received three letters which give a most satisfactory endorsement of its Hercules Anchors. These come from the Muncie Electric Light Company, Muncie, Ind.; the Eastern Indiana Telephone Company, Winchester, Ind., and the Electric Light & Water Works of the City of Portland, Portland, Ind. The points brought out are the great hold taken by this type of anchor upon the earth and the extreme small cost of installing, the two main qualities which have made them give especially good satisfaction.

REASONS WHY PAY STATIONS PAY.

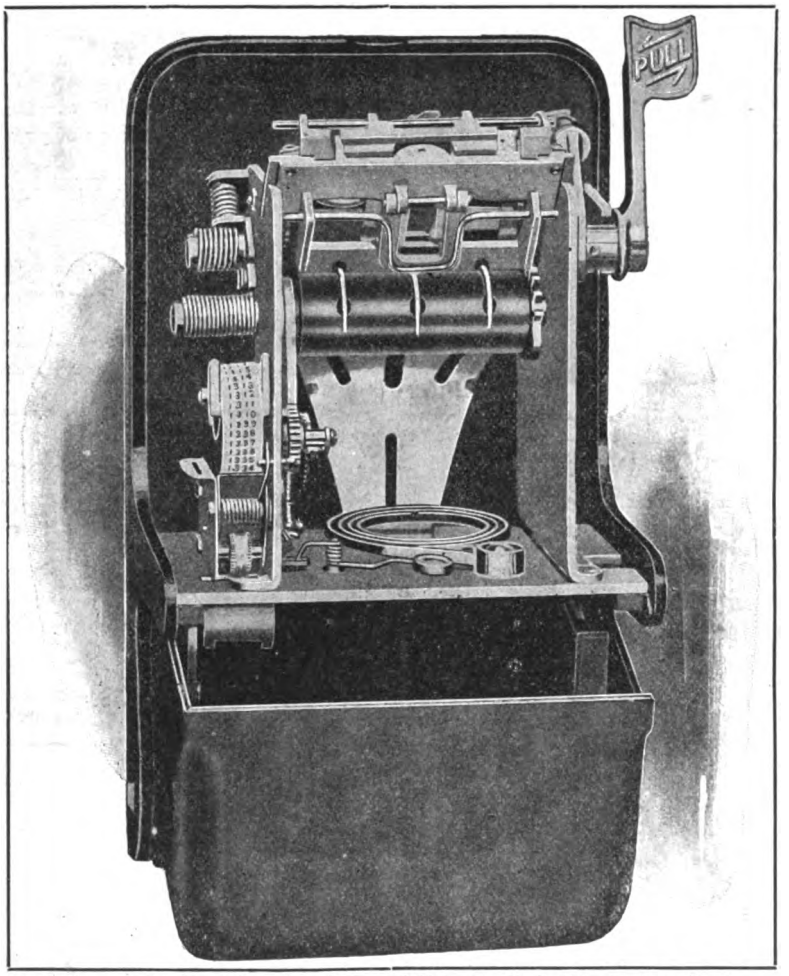
BEFORE National cash registers were put on the market merchants were content with an ordinary cash drawer. This cash drawer did only two things. It received the money and divided the denominations into piles, that one might make change easily.

The National cash register is a great improvement over the old cash drawer. It not only receives and divides the money, but it counts, records, issues a cash ticket, and keeps a correct and just account of all sales during the day, and these improvements are of such importance that almost every up-to-date business house will not be without it.

Why must they have it?

It protects them against errors, theft, and accounts for all sales, systematizes their business and makes money for them.

Telephone companies are now in the same position as the merchants were before a cash register was made. The time has arrived when they can do away with all pay stations that do only two things; namely, receive all deposits and notify the operator that such deposits have been made.



Mechanism of the Recording Pay Station Sold by the U. S. Coin Register Company.

The United States Coin Register Pay Station is not only a pay station, but it is also a cash register. This pay station receives and records all deposits, notifies the operator of the proper coin recorded and issues a cash ticket from a tape, which is numbered from 1 to 2,000. It is provided with a carbon strip which, when passing through the feed wheels, prints on the back of the tape the required number of dashes, according to the denomination of the coin deposited. Every impression represents 5 cents. A cross is printed every tenth dash, making it easy to count by tens. The number of the pay station is also printed every twentieth impression.

At every blow of the gong the tape moves one number into the cash box; one blow for 5 cents, two blows for 10 cents, and five blows for 25 cents. The box being opened by the collector automatically cuts off the tape at the last number recorded. The total number of impressions on this piece of tape, multiplied by 5, must be the correct amount of the collection, and is taken to the auditor with the money. The tape is then filed to be retained until the next collection. The piece of tape from the next collection must start to number where the last piece of tape filed was cut off, and so on until the tape is fully used.

This system is said to avoid all errors, thefts, disputes and trouble, and systematizes the work of pay station accounting in a most satisfactory manner.

The U. S. Coin Register Company, of Toledo, Ohio, manufactures this apparatus and is the first company to put on the market a measured service recording pay station.

THE EWING-MERKLE ELECTRIC COMPANY, 1106 Pine street, St. Louis, Mo., in the May number of its "Everbest Magazine," has as usual an issue which is attractive in appearance and filled with much interesting material. An especially interesting brief article gives a comparison of the cost per horse power between steam and gas engine plants in a number of different states. The series of lessons on testing incandescent lamps is continued from former issues, and a number of verses appropriate to the season are included in the book, copies of which will be sent free of charge to those who write to the company.

THE AUTOMATIC ELECTRIC COMPANY, Chicago, has recently issued an interesting statement to its stockholders. It includes figures concerning the progress of the company and the status of automatic telephony which are of general interest. As a number of extra copies are now on hand the company will be pleased to forward them to telephone officials who write before the supply, which is going very quickly, is completely exhausted.

THE NORTH ELECTRIC COMPANY, Cleveland, O., in its bulletin No. 33 describes some very interesting auxiliary switchboard apparatus. Illustrations show types of the various pieces of apparatus manufactured by this company. Some especially good construction features are indicated. The bulletin also includes diagrams of North's two and four party selective systems.

THE HALLETT IRON WORKS, 96 West Polk street, Chicago, Ill., is now receiving many large orders from companies which are rebuilding their plants. This company manufactures a line of construction specialties which have numerous original features.

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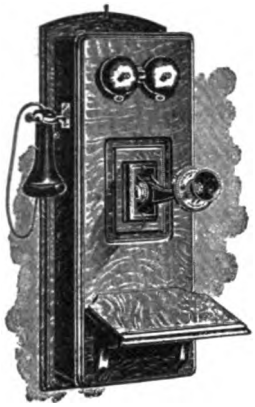

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with all connecting wires, binding posts and terminal screws fully concealed

To Prevent Trouble

and with no exposed metal parts in the circuit to

Avoid Danger

from lightning while using the instrument. Send us your inquiry and we will "SHOW-U" at our expense an interesting proposition.

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Switches

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List price 41 cts.
Discount 50%.

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must be absolutely reliable. The Trumbull "U" clip insures perfect contact.

Small companies can economize by installing a compact arrangement of these switches instead of a drop switchboard.

Write for diagram and information.

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Cords for Telephones and Switchboards
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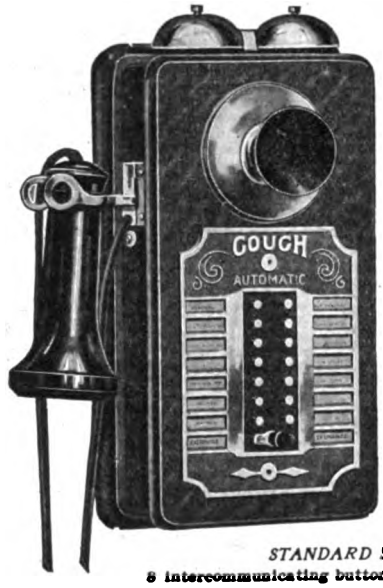
Runzel-Lenz Electric Mfg. Co.

97-101 South Clinton Street, Chicago

WE HUNG UP OUR SHINGLE



in 1894 and have been at it ever since, making telephones principally for intercommunicating service.

We used to make a good telephone when we first started, and we've kept up the good work. Our latest is devised to take the place of the branch exchange. It's an automatic instrument with auxiliary trunk line connections. Even if you don't want to buy right now, we'd like to tell you about it. Just send in your name.

Trunk Button — *Send for Catalogues*

STANDARD SIZES:

8	intercommunicating	buttons,	1	exchange	button
14	"	"	1	"	"
18	"	"	1	"	"
24	"	"	1	"	"
28	"	"	1	"	"

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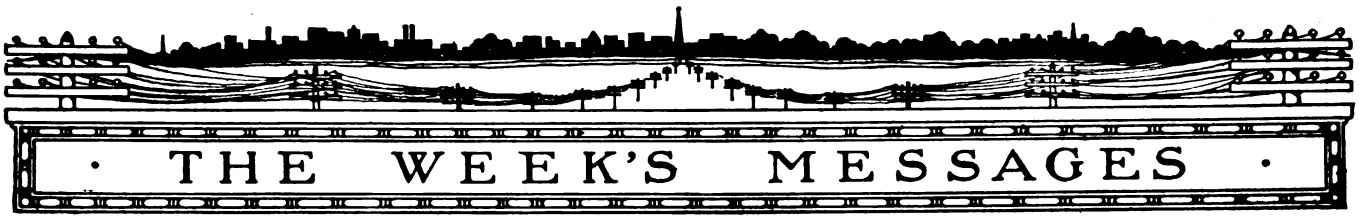

NEW COMPANIES.

JONESBORO, ARK.—The Automatic Home Telephone Company has been organized by the business men of Jonesboro. The company proposes to install a strictly up-to-date plant.

DOVER, DEL.—The State Department at Dover, Del., has issued articles of incorporation to the People's Home Telephone Company for rural and city operations. The capital stock is $300,000, and the incorporators are all from Chicago, Ill. Field of operations is not at this time known.

LARGO, FLA.—A new telephone company has been organized at Largo to be known as the West Coast Telephone Company. The officers of the company are: President, M. W. Ulmer; vice president, Dr. Byrd McMullen; secretary and treasurer, E. B. McMullen; directors, J. S. Taylor, R. L. McMullen, J. C. Whittle, F. M. Campbell, J. A. Walsingham, M. W. Ulmer and others.

EVANSVILLE, IND.—The Advance Telephone Company has been incorporated with a capital stock of $650. The company will build and operate lines in Vanderburg County. The incorporators are Henry Denzer, Henry Hartig and Charles Boeke.

ORLEANS, IND.—The Irvine Telephone Company, with a capital stock of $6,000, has recently been incorporated. The company will build, maintain and operate a telephone exchange and telephone lines in Orange County. Ruben E. Chaltrand, W. H. Taggart, James Pickens, Aaron Speer, A. T. Marmon and others are the incorporators.

MOORLAND, IA.—The Moorland Mutual Telephone Company has been incorporated with a capital stock of $5,000.

MOLINE, KAS.—The Moline Telephone Company, of Moline, Kas., has been incorporated.

ST. JOHN, KAS.—Articles of incorporation have been filed by the Albene Central Telephone Company, of St. John, Kas.

TOPEKA, KAS.—The Independent Telephone Construction Company of Topeka, Kas., has been incorporated.

BARDWELL, KY.—An Independent Telephone Company, which will connect with all the rural lines in the vicinity of Fulton, Ky., has been organized at Bardwell. Jesse Nicholas has been made president. The board of directors is composed of J. G. Samuels, W. G. Ward and T. D. Bugg.

AUGUSTA, ME.—The North Dakota Independent Telephone Company has been organized at Augusta, Me., for the purpose of constructing and operating local and long distance telephone lines, with $3,000,000 capital stock. Officers: President, L. J. Coleman, of Gardiner; treasurer, A. M. Macomber, of Augusta, Me.

PAPILLION, NEB.—The Farmers Mutual Telephone Company of Sarpy County has been organized.

CENTER LISLE, N. Y.—The East Berkshire Telephone Company, with a capital stock of $2,000, has been incorporated for fifty years. The directors are P. Herman Beebe and Aaron J. Clute, of Center Lisle, and Herman Bunnell, Jesse H. Walter, Walter Hartwell, O. A. Austin, Frank Austin, Ernest Phillips and Vernon Marsh.

LISLE, N. Y.—The East Richford Telephone Company has filed articles of incorporation. The company will build a line from Lisle to Richfield.

UNADILLA, N. Y.—The Unadilla Valley Telephone Company has been incorporated with a capital stock of $1,500. Incorporators are A. C. Foote, Guilford; S. F. Benjamin, Rockwells Mills, and G. Cox, Mount Upton. Field of operations has not yet been named.

KENDRICK, OKLA.—Articles of incorporation have been filed by the Kendrick & Avery Telephone Company, of Kendrick, Okla. The capital stock is $10,000, and the following directors have been elected: Chas. McClure, A. M. G. Hawse, J. C. Pringey, F. E. Galpin and S. O. Davis, all of Kendrick.

AGNES, TEXAS.—The Agnes Union Telephone Company, of Agnes, Parker Co., Texas, has been incorporated with a capital stock of $30,000. The incorporators are J. W. Moose, J. M. Frazier, of Agnes; W. J. Sims, of Roberts, Texas.

COLLEGE STATION, TEXAS.—The Agricultural and Mechanical College is to have a local telephone exchange connecting all the houses and business offices with each other, and with the Bryan Exchange and long distance lines. A company has been organized with a capital stock of $2,000. The incorporators of the company are Profs. J. C. Nogle, F. E. Geisecke, N. H. Brown, W. D. Spence and J. S. Weir.

COX'S LANDING, W. VA.—The Cox's Landing & Guyandotte Telephone Company has been formed to build a line from Cox's Landing to Guyandotte and connect with Huntington. The officers of the company are: President, H. W. Carson, Union Ridge; secretary, F. A. Macdonald, Huntington; treasurer; W. B. Frazer, Glenwood.

FRANCHISES.

LAWRENCE, MASS.—Another petition has been presented for a telephone company at Lawrence, to be known as the Lawrence Automatic Telephone Company. The company proposes to incorporate under the laws of Massachusetts, for the purpose of constructing and operating telephone systems and exchanges within the commonwealth. Those interested in the granting of the franchise are Col. Albert Clarke, A. L. Ireland, J. G. Ferguson, J. T. Connor, B. M. Wolf, W. S. Littlefield, J. F. Brock, T. V. Johnson and Henry Delano, of Boston; W. J. Bradley, E. L. Arundel and C. E. Bradley, of Lawrence.

MOOSE LAKE, MINN.—The Barnum Telephone Company, of Barnum, has secured a franchise for a telephone exchange at Moose Lake.

GREAT FALLS, MONT.—The Montana Independent Telephone Company, which operates exchanges at Billings, Lewiston, Red Lodge and other places, is to apply for a franchise at Great Falls.

OMAHA, NEB.—Three companies are endeavoring to secure franchises at Omaha. The petitions come from the Omaha Home Telephone Company, which wants a fifty year franchise, and the Heim-Parmelee-Pollock Company and the Van Hoffman interests, the two latter companies requesting perpetual rights.

WAKEFIELD R. I.—The Home Telephone Company, of Providence, is to ask for the right to construct a telephone line in Wakefield.

ANACORTES, WASH.—The Home Telephone Company of Puget Sound has made application for a telephone franchise at Anacortes.

FINANCIAL.

DETROIT, MICH.—The Home Telephone Company has increased its capital stock to $6,000,000.

CLAYTON, MO.—The capital stock of the Suburban Telephone Company has been increased from $100,000 to $600,000.

CAYUGA, N. Y.—The Southern Cayuga Telephone Company has increased its capital stock from $15,000 to $30,000.

CLEVELAND, O.—The United States Telephone Company has increased its capital stock from $2,500,000 to $4,500,000.

ELMWOOD, WIS.—The capital stock of the Highland Telephone Company, Elmwood, has been increased from $1,000 to $10,000.

COMBINATIONS.

OWENSBORO, KY.—The Owensboro Home Telephone Company has been absorbed by the Central Home Telephone Company. The long distance lines from Owensboro to Lexington and the one from Owensboro to Bowling Green have also been taken over by the Central Company, and arrangements are being made for taking over the exchanges at Paducah, Hopkinsville, Clarksville and Henderson, with their long distance lines.

COOLEYVILLE, MASS.—The Highland Telephone Company is completing arrangements for taking over the lines owned by G. V. Bowen in North Leverett and Leverett. The Highland Telephone Company will build from Cooleyville through Locks Village to Moore's Corner, to connect with the North Leverett lines.

SARANAC, MICH.—The Saranac Telephone Company has been ac-

NEWS—WANTED

THE matter contained upon the Message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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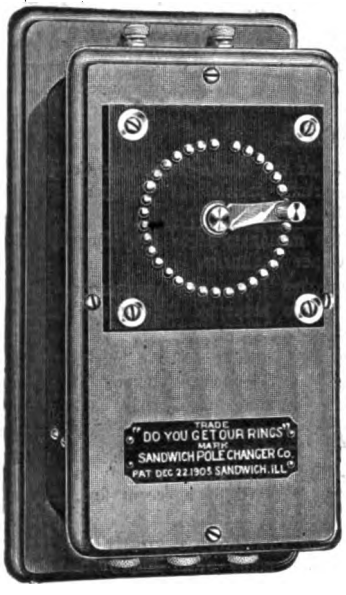
TO GET THREE OUT OF TWO SEEMS IMPOSSIBLE

Yet the Illinois and Sandwich Duplexers easily make two metallic circuits into three



Just stop and think what this means to you in increased facilities without spending a cent for new line construction.

Here are the facts in the case: By connecting our duplexers to the two existing metallic circuits a new one is formed which utilizes each pair of wires as one side of an independent metallic line.

To eliminate all noise due to induction we provide a very simple and efficient balancing device which requires no skill in its manipulation and which will make the new circuit absolutely quiet.

Seems almost too good to be true. Let us prove it by sending a set on 30 days free trial.

We know you are interested; therefore don't delay, but write to-day

Sandwich Polo Changor Company

400 Eddy Street, Sandwich, Ills.

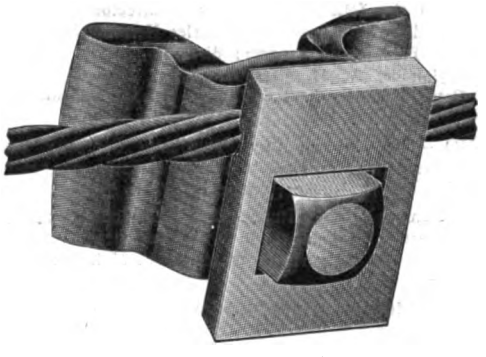
Canadian Cedar Poles

Are Stockier and Last Longer Than American Cedar

We have all sizes in stock, especially 25 ft. 5, 6 and 7-inch tops, and 30 ft. 5 and 6-inch tops. Immediate Shipment from our Canadian Yards.

Write for Prices

J. B. FARWELL & SON Oswego, N. Y.



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Little Giant
Messenger Hanger

is made from *forged steel*. Only one bolt or lag screw in each hanger. Quickest to put up, but *it stays!*

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THE WEEK'S MESSAGES

quired by the Citizens Telephone Company of Grand Rapids, which will greatly improve the system.

SOUTH BOSTON, VA.—The Dan River Telephone Company has purchased the South Boston Telephone line and its franchise from R. A. Perkinson, and will enlarge the system.

ELECTIONS.

KEWANEE, ILL.—The Kewanee Home Telephone Company has elected the following officers: President, W. I. Hibbs; vice-president, F. A. Ellithorp; secretary and treasurer, A. C. Shoemaker.

NORTH ORANGE, MASS.—The following officers have been elected by the North Orange Telephone Company: S. J. Oliver, president; Adin Taylor, secretary and treasurer.

GROVE CITY, MINN.—The Grove City and Rosendale Telephone Exchange Company has elected the following officers and directors: O. P. Willner, president; Peter Madson, vice president; Charles Nelson, secretary; A. Liedholm, treasurer; A. P. Nelson, manager; directors, A. P. Nelson, A. Liedholm, Albert Waylander, A. M. Person, Charles Nelson, H. L. Larson, C. C. Reitan, Peter Hanson, O. P. Willner, A. M. Nelson and Peter Madson.

AVENUE CITY, MO.—The Avenue City Telephone Company has elected the following officers: President, Robert Archdeacon; vice-president, T. J. Kelly; secretary, E. D. Rucker; treasurer, E. L. Schneider.

WISNER, NEB.—The Cuming County Independent Telephone Company has elected the following officers: President, J. E. Albers; vice president, W. H. Hille; secretary, B. H. Von Seggern; treasurer, J. E. Melcher; manager, J. E. Albers.

MESHOPPEN, PA.—The Meshoppen and Auburn Telephone Company has elected the following officers and directors: President, G. A. Carter; vice president, O. H. Allen; secretary, A. H. Sterling; treasurer, F. M. Vaughn; directors, G. A. Carter, F. M. Vaughn, A. H. Sterling, O. H. Allen and Andrew Carter.

BLOOMSBURG, PA.—The People's Telephone Company has elected the following officers: President, L. W. Welliver; vice-president, J. E. Shuman; secretary, D. A. Cox; treasurer, L. W. Lowry.

QUEBEC, P. Q., CAN.—The Bellechasse Telephone Company at its recent meeting at Quebec elected the following officers; Geo. Demers, president; A. B. Dupuis, vice president; J. F. Demers, general manager.

PERSONALS.

E. L. CLINE, formerly chief engineer of the Home Telephone Company of Utica, N. Y., has accepted the important position of manager of the Home Telephone Company of Toledo, Ohio.

FREDERICK KRAMER has taken the management of the office of the Central Union Telephone Company at Upper Sandusky, O.

FRANK LUKENBELL has been promoted from the management of its office at Findlay, O., to that of the Toledo plant by the Central Union Telephone Company.

ALBERT SCHULER has been appointed superintendent of maintenance and operation by the Citizens' Independent Telephone Company of Terre Haute, Indiana.

MISCELLANEOUS.

RUSSELLVILLE, ARK.—The Russellville Telephone Company is stringing new cables to take the place of those damaged by a recent fire, and is also extending its lines.

DALTON, GA.—The Dalton Telephone Company is greatly enlarging its exchange at Dalton, and is also making many other improvements in its system.

CEDAR RAPIDS, IA.—The Cedar Rapids and Marion Telephone Company has been ordered to place its wires underground in Cedar Rapids.

THIEF RIVER FALLS, MINN.—Messrs. Math. Barzan, C. L. Dobner, W. W. Prichard, Anton Langseth and C. M. Evenson, on behalf of the city, are endeavoring to acquire possession of the Fant Telephone Exchange.

FAIR PLAY, MO.—J. D. Randell has sold his telephone exchange to C. E. Oldham.

New Construction in the Field

NEW CAMBRIA, KAS.—The New Cambria Telephone Company is installing its system at New Cambria.

BALTIMORE, MD.—The Maryland Telephone Company intends to extend its lines into the suburbs. It also contemplates the expenditure of $1,250,000 in improvements in the early fall.

WILLIAMSBURG, MASS.—The Citizens' Independent Telephone Company is constructing a line from Haydenville to Northampton.

IRON MOUNTAIN, MICH.—The Menominee Range Telephone Company, which has just completed the construction of a line to Norway, contemplates many improvements in its system.

COMFREY, MINN.—The Comfrey Telephone Company contemplates building a line from Darfur to Sveadahl.

DILLON, MONT.—The Southern Montana Telephone Company contemplates the extension of its lines to Wisdom, Jackson, Fox and a number of other places.

HAPPY VALLEY, MO.—The Farmers Mutual Telephone Company is to install a new exchange at Happy Valley.

WESNER, NEB.—The Independent Telephone Company expects to extend its lines to West Point, Neb.

ASHLAND, N. H.—The Citizens Telephone Company expects to build a line from Ashland to Holderness.

HANOVER, N. H.—The Hanover Telephone Company, which has recently purchased the Hanover branch of the Norwich line, contemplates the construction of a line from Hanover to Lebanon.

CLEVELAND, O.—One of the principal improvements which the United States Telephone Company will make with the $200,000 it is to expend will be the building of a main line between Cleveland and Wheeling. The company will also install a larger toll board in its offices at Cleveland.

COLUMBUS, O.—The Columbus Citizens Telephone Company is going to extend its lines.

LEBANON, O.—The Valley Telephone Company, of Lebanon, will spend about $13,000 in improving its plant.

EATON, O.—The Eaton Telephone Company has just completed a line from Campbelltown to Richmond.

SYRACUSE, O.—The Syracuse Citizens Telephone Company is to build lines to Racine, Minersville and Pomeroy.

MT. VERNON, O.—A franchise has been granted to the Mt. Vernon Telephone Company to use the streets and alleys of Mt. Vernon for the purpose of constructing an underground system.

NEW BEDFORD, PA.—An Independent telephone system is being constructed on the Sharon and New Castle street car line. The central office will be located at New Bedford.

MILLER, S. D.—The Ree Hills Telephone Company has under construction a number of farmers' lines.

PLANO, TEX.—The Texas Tel. & Tel. Company will arrange for rebuilding and extending its lines in Texas.

DAYTON, VA.—The Dayton & Bridgewater Telephone Company is to install a new exchange at Dayton.

ALLIANCE, W. VA.—The Alliance Telephone Company has planned to build a telephone system at Parsons.

PARKERSBURG, W. VA.—The Citizens Telephone Company contemplates installing an exchange at Reedy.

APPLETON, WIS.—The Independent Telephone Company at Appleton, Wis., is anxious to establish connections with Milwaukee and is willing to put up a bond for the protection of the city of Milwaukee from any damage that might result from its failure to fulfill the terms of the franchise it seeks.

CLARNO, WIS.—The East Clarno Telephone Company, with its offices at Clarno, has under way the construction of several new lines.

CALGARY, ALB., CAN.—The Council has instructed the city engineer to prepare estimates and secure all information regarding the installation of a municipal telephone system. Address Ald. Mitchell.

CRANBROOK, B. C., CAN.—The Cranbrook Electric Light & Telephone Company has decided to extend its line through Elko, Elkmouth, Wardner and Baynes to Fernie. Address Malcolm McInnis, Elkmouth, B. C.

PRINCETON, B. C.—E. Barr Hall is installing a private telephone system to connect with the government line. Other extensions will also be made.

WINNIPEG, MAN., CAN.—The Canadian Pacific R. R., which has installed a telegraphone wire between Winnipeg and Montreal, a distance of 1,400 miles, by which a telephone and telegraph message can be sent at the same time, is to install similar wires. Address Supt. Kent, Montreal.

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The American Telephone Journal

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VOLUME XIV *SATURDAY, JULY 14, 1906* *NUMBER 2*

Harmonic Party Line Systems

By W. W. Dean.

THE name Harmonic Party Line System has been given to a system of selective bells for telephone party lines which has come into very general use in the past four years among the Independent telephone companies of this country. Referring to Mr. Kempster B. Miller's book "American Telephone Practice," with regard to Harmonic Party Line Systems you find the following passage, which I consider the most lucid explanation of the principle involved in this class of systems which I have ever seen. He says:

"These systems, with one exception, make use of the fact that every pendulum, or every vibrating reed, has a natural period of vibration, and that it can be made to take up this vibration by the action of a succession of impulses of force occurring in the same frequency as that in which the reed or pendulum vibrates. A familiar example of this is found in one person pushing another in a swing. The swing has its natural period of vibration depending on the length of the ropes, and a gentle push applied at proper intervals by the person on the ground will cause the swing to vibrate with considerable amplitude. If the pushes are applied at intervals not corresponding to the natural period of vibration of the swing, many of them tend to retard rather than help its vibrations, so that a useless bumping results, producing but little motion."

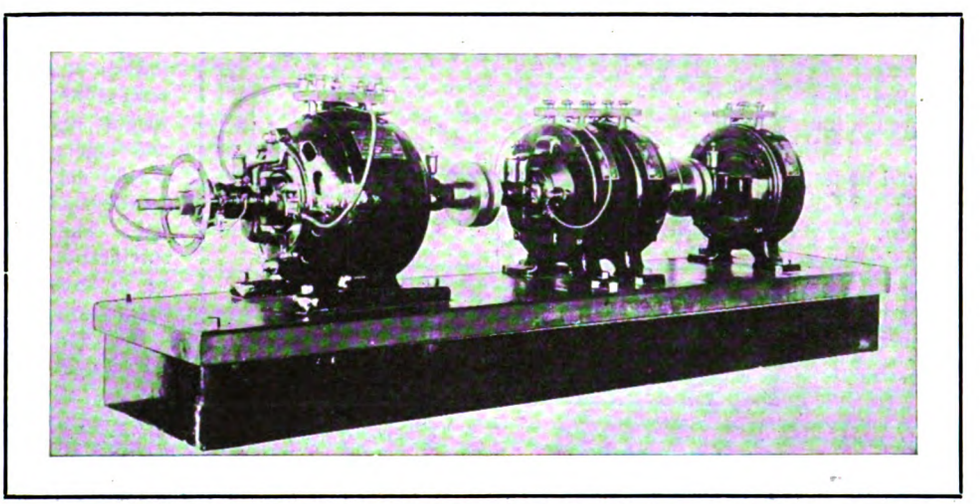

Fig. 7. Motor-generator set used to furnish ringing current of four different frequencies.

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quired by the Citizens Telephone Company of Grand Rapids, which will greatly improve the system.

SOUTH BOSTON, VA.—The Dan River Telephone Company has purchased the South Boston Telephone line and its franchise from R. A. Perkinson, and will enlarge the system.

ELECTIONS.

KEWANEE, ILL.—The Kewanee Home Telephone Company has elected the following officers: President, W. I. Hibbs; vice-president, F. A. Ellithorp; secretary and treasurer, A. C. Shoemaker.

NORTH ORANGE, MASS.—The following officers have been elected by the North Orange Telephone Company: S. J. Oliver, president; Adin Taylor, secretary and treasurer.

GROVE CITY, MINN.—The Grove City and Rosendale Telephone Exchange Company has elected the following officers and directors: O. P. Willner, president; Peter Madson, vice president; Charles Nelson, secretary; A. Liedholm, treasurer; A. P. Nelson, manager; directors, A. P. Nelson, A. Liedholm, Albert Waylander, A. M. Person, Charles Nelson, H. L. Larson, C. C. Reitan, Peter Hanson, O. P. Willner, A. M. Nelson and Peter Madson.

AVENUE CITY, MO.—The Avenue City Telephone Company has elected the following officers: President, Robert Archdeacon; vice-president, T. J. Kelly; secretary, E. D. Rucker; treasurer, E. L. Schneider.

WISNER, NEB.—The Cuming County Independent Telephone Company has elected the following officers: President, J. E. Albers; vice president, W. H. Hille; secretary, B. H. Von Seggern; treasurer, J. E. Melcher; manager, J. E. Albers.

MESHOPPEN, PA.—The Meshoppen and Auburn Telephone Company has elected the following officers and directors: President, G. A. Carter; vice president, O. H. Allen; secretary, A. H. Sterling; treasurer, F. M. Vaughn; directors, G. A. Carter, F. M. Vaughn, A. H. Sterling, O. H. Allen and Andrew Carter.

BLOOMSBURG, PA.—The People's Telephone Company has elected the following officers: President, L. W. Welliver; vice-president, J. E. Shuman; secretary, D. A. Cox; treasurer, L. W. Lowry.

QUEBEC, P. Q., CAN.—The Bellechasse Telephone Company at its recent meeting at Quebec elected the following officers; Geo. Demers, president; A. B. Dupuis, vice president; J. F. Demers, general manager.

PERSONALS.

E. L. CLINE, formerly chief engineer of the Home Telephone Company of Utica, N. Y., has accepted the important position of manager of the Home Telephone Company of Toledo, Ohio.

FREDERICK KRAMER has taken the management of the office of the Central Union Telephone Company at Upper Sandusky, O.

FRANK LUKENBELL has been promoted from the management of its office at Findlay, O., to that of the Toledo plant by the Central Union Telephone Company.

ALBERT SCHULER has been appointed superintendent of maintenance and operation by the Citizens' Independent Telephone Company of Terre Haute, Indiana.

MISCELLANEOUS.

RUSSELLVILLE, ARK.—The Russellville Telephone Company is stringing new cables to take the place of those damaged by a recent fire, and is also extending its lines.

DALTON, GA.—The Dalton Telephone Company is greatly enlarging its exchange at Dalton, and is also making many other improvements in its system.

CEDAR RAPIDS, IA.—The Cedar Rapids and Marion Telephone Company has been ordered to place its wires underground in Cedar Rapids.

THIEF RIVER FALLS, MINN.—Messrs. Math. Barzan, C. L. Dobner, W. W. Prichard, Anton Langseth and C. M. Evenson, on behalf of the city, are endeavoring to acquire possession of the Fant Telephone Exchange.

FAIR PLAY, MO.—J. D. Randell has sold his telephone exchange to C. E. Oldham.

New Construction in the Field

NEW CAMBRIA, KAS.—The New Cambria Telephone Company is installing its system at New Cambria.

BALTIMORE, MD.—The Maryland Telephone Company intends to extend its lines into the suburbs. It also contemplates the expenditure of $1,250,000 in improvements in the early fall.

WILLIAMSBURG, MASS.—The Citizens' Independent Telephone Company is constructing a line from Haydenville to Northampton.

IRON MOUNTAIN, MICH.—The Menominee Range Telephone Company, which has just completed the construction of a line to Norway, contemplates many improvements in its system.

COMFREY, MINN.—The Comfrey Telephone Company contemplates building a line from Darfur to Sveadahl.

DILLON, MONT.—The Southern Montana Telephone Company contemplates the extension of its lines to Wisdom, Jackson, Fox and a number of other places.

HAPPY VALLEY, MO.—The Farmers Mutual Telephone Company is to install a new exchange at Happy Valley.

WESNER, NEB.—The Independent Telephone Company expects to extend its lines to West Point, Neb.

ASHLAND, N. H.—The Citizens Telephone Company expects to build a line from Ashland to Holderness.

HANOVER, N. H.—The Hanover Telephone Company, which has recently purchased the Hanover branch of the Norwich line, contemplates the construction of a line from Hanover to Lebanon.

CLEVELAND, O.—One of the principal improvements which the United States Telephone Company will make with the $200,000 it is to expend will be the building of a main line between Cleveland and Wheeling. The company will also install a larger toll board in its offices at Cleveland.

COLUMBUS, O.—The Columbus Citizens Telephone Company is going to extend its lines.

LEBANON, O.—The Valley Telephone Company, of Lebanon, will spend about $13,000 in improving its plant.

EATON, O.—The Eaton Telephone Company has just completed a line from Campbelltown to Richmond.

SYRACUSE, O.—The Syracuse Citizens Telephone Company is to build lines to Racine, Minersville and Pomeroy.

MT. VERNON, O.—A franchise has been granted to the Mt. Vernon Telephone Company to use the streets and alleys of Mt. Vernon for the purpose of constructing an underground system.

NEW BEDFORD, PA.—An Independent telephone system is being constructed on the Sharon and New Castle street car line. The central office will be located at New Bedford.

MILLER, S. D.—The Ree Hills Telephone Company has under construction a number of farmers' lines.

PLANO, TEX.—The Texas Tel. & Tel. Company will arrange for rebuilding and extending its lines in Texas.

DAYTON, VA.—The Dayton & Bridgewater Telephone Company is to install a new exchange at Dayton.

ALLIANCE, W. VA.—The Alliance Telephone Company has planned to build a telephone system at Parsons.

PARKERSBURG, W. VA.—The Citizens Telephone Company contemplates installing an exchange at Reedy.

APPLETON, WIS.—The Independent Telephone Company at Appleton, Wis., is anxious to establish connections with Milwaukee and is willing to put up a bond for the protection of the city of Milwaukee from any damage that might result from its failure to fulfill the terms of the franchise it seeks.

CLARNO, WIS.—The East Clarno Telephone Company, with its offices at Clarno, has under way the construction of several new lines.

CALGARY, ALB., CAN.—The Council has instructed the city engineer to prepare estimates and secure all information regarding the installation of a municipal telephone system. Address Ald. Mitchell.

CRANBROOK, B. C., CAN.—The Cranbrook Electric Light & Telephone Company has decided to extend its line through Elko, Elkmouth, Wardner and Baynes to Fernie. Address Malcolm McInnis, Elkmouth, B. C.

PRINCETON, B. C.—E. Barr Hall is installing a private telephone system to connect with the government line. Other extensions will also be made.

WINNIPEG, MAN., CAN.—The Canadian Pacific R. R., which has installed a telegraphone wire between Winnipeg and Montreal, a distance of 1,400 miles, by which a telephone and telegraph message can be sent at the same time, is to install similar wires. Address Supt. Kent, Montreal.

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VOLUME XIV *SATURDAY, JULY 14, 1906* *NUMBER 2*

Harmonic Party Line Systems

By W. W. Dean.

THE name Harmonic Party Line System has been given to a system of selective bells for telephone party lines which has come into very general use in the past four years among the Independent telephone companies of this country. Referring to Mr. Kempster B. Miller's book "American Telephone Practice," with regard to Harmonic Party Line Systems you find the following passage, which I consider the most lucid explanation of the principle involved in this class of systems which I have ever seen. He says:

"These systems, with one exception, make use of the fact that every pendulum, or every vibrating reed, has a natural period of vibration, and that it can be made to take up this vibration by the action of a succession of impulses of force occurring in the same frequency as that in which the reed or pendulum vibrates. A familiar example of this is found in one person pushing another in a swing. The swing has its natural period of vibration depending on the length of the ropes, and a gentle push applied at proper intervals by the person on the ground will cause the swing to vibrate with considerable amplitude. If the pushes are applied at intervals not corresponding to the natural period of vibration of the swing, many of them tend to retard rather than help its vibrations, so that a useless bumping results, producing but little motion."

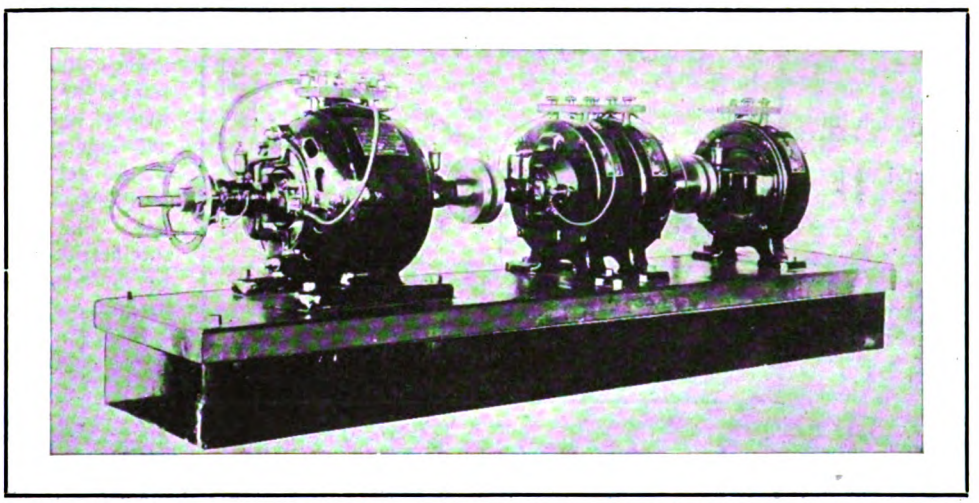

Fig. 7. Motor-generator set used to furnish ringing current of four different frequencies.

When a tuning fork is struck near a piano, which is in perfect tune, the corresponding note of the instrument will sound out clearly. You have probably already noticed that when you make a musical sound in a room either by whistling, singing, or playing a musical instrument, that some object such as the globe of a chandelier or the strings of a piano will reproduce the original sound. In the foregoing illustration the sympathetic tone was produced by impulses of force transmitted through the medium of the air from the original sounding body to the one reproducing it. When the tuning fork was sounded the resultant air vibrations came into contact with every string in the piano, but they were strong enough to move only the one which happened to be in tune with them. We can imagine that the noise made by the firing of a revolver in the same room would cause all of the notes of the piano to sound at once regardless of pitch. The pendulum of a clock or the balance wheel of a watch is kept in motion by the almost infinitesimal blows of their escapements, which blows are applied at exactly the proper instant, but we also know that both a clock and a watch run faster when first wound, when the spring is strong, than when nearly run down. For instance, in Mr. Miller's illustration of the swing, it is evident that if the individual doing the pushing were sufficiently strong, he would be able to operate the swing regardless of whether the impulses of force employed occurred in the natural period of vibration of the swing or not. I mention these exceptions to the law of harmonic vibrations to bring to your notice the importance of the strength as well as the frequency of the impulses of force applied. We come now to the application of the foregoing principles to the commercial selective party line system. All that is necessary to accomplish this result is to distribute your tuned devices, which in this case are the bell armatures, at the telephone subscribers' stations and operate them by electromagnets energized by alternating currents of electricity of the proper frequencies and strengths sent over the telephone lines.

Selective systems of this kind both for telegraphy and telephony were early designed. Mr. Miller says: "This idea was used in telegraphy before the birth of telephony. A number of currents of different rates of vibration were impressed upon the circuit by as many different transmitters, each particular rate of vibration being capable of operating a reed in one of the receiving instruments, and producing no effect on the other. By this means each receiving instrument was capable of picking out only those signals sent by the transmitter having the same rate of vibration, and thus all of the transmitters could be used simultaneously in the same circuit, producing a system of multiplex telegraphy."

One of the earliest systems of this kind was that invented by Thomas A. Edison, and patented in 1877.

In the upper part of Fig. 1 is a copy of the patent drawing. In Edison's system a group of magnets, whose armatures were reeds tuned to respond to different frequencies, were connected in series in the line. At the top of the drawing is illustrated a

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mechanism for producing the pulsating currents of proper frequencies. In front of each armature, you will notice, is a small Helmholtz resonator to increase the volume of sound. It was possible by means of this combination for a number of messages to be sent over a line simultaneously. A great many harmonic telegraphs have been invented, prominent among the names of their inventors being those of the well-known scientists Elisha Gray and Prof. Rowland.

The first harmonic selective party line system was that invented by J. B. Currier, and patented by him in 1881, and used for several years by the New England Bell Telephone Company. The diagram in the middle of Fig. 1 represents a copy of the patent drawing. In this system the electromagnets with their armatures, which in this case contained the bell tapper, were arranged in series in the line the same as in the Edison harmonic telegraph. Currier produced his pulsating currents by means of pendulums of different lengths, which pendulums were provided with contacts for interrupting the ringing current.

The next improvement invented in this line was the system of J. A. Lighthipe, patented in 1895, which was used to a limited extent by the Bell Telephone Company on the Pacific Coast. Lighthipe's system, shown in the lower part of Fig. 1, is almost identical with the harmonic selective party line systems in use to-day. He was the first one to introduce the condenser in series with the bell across the line to prevent the central office current from flowing through the magnet coils.

It is very easy to see and understand why early harmonic systems were not an entire success. Two things are necessary for the successful operation of systems of this class, the current impressed on the ringing mechanism must be of constant frequency, and of approximately uniform potential. When we look back on early telephonic conditions, we see that these things were not available. How could we expect to deliver a current of constant frequency and potential to our bells when we had bad lines, no storage batteries, no ringing machines? Even if we had been able to obtain this apparatus we would not have had the splendid sources of electric power at present available for its operation. What has really made possible the use of harmonic party line systems has been the introduction in the last few years of modern engineering methods into the telephone business. With the advent of the educated telephone engineer came good lines and modern power apparatus, making possible the use of much more refined central office and sub-station apparatus. What the skilled engineer has accomplished for the telephone art has been so ably discussed by Mr. J. J. Carty in his paper on "Telephone Engineering," recently presented to The American Institute of Electrical Engineers, as to make it superfluous for me to go further into the subject.

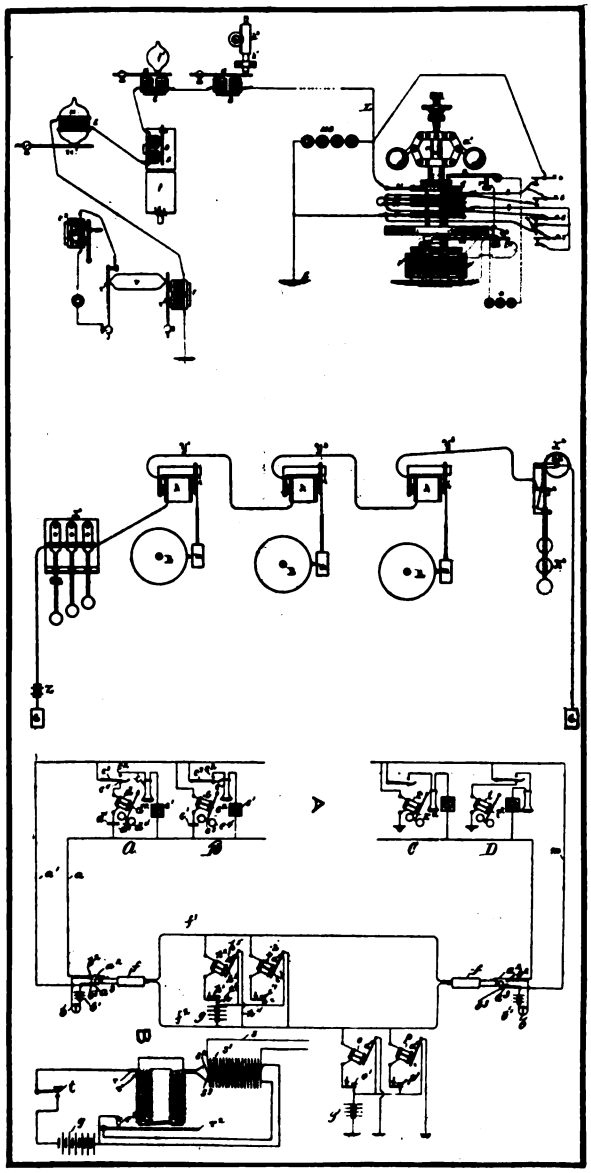


Fig. 1. Patent drawings of early harmonic systems. Arranged from the top downward are circuits designed by Edison, J. B. Currier and J. A. Lighthipe.

Early telephone experts never expected that the time would come when each telephone subscriber would be provided with an individual metallic circuit, consequently a large amount of work was done by them along the lines of developing selective party line systems. I myself remember that in St. Louis, in the early eighties, a system which employed the "step by step" mechanism was used and as high as sixteen parties were rung selectively on one line; this was known as the "Bliss System." All one has to do is to investigate the United States patent records to convince himself that there is nothing new in selective systems; every possible combination of "step by step" mechanisms, polarized relays, and in fact every device known to the mechanician and electrician, were combined to produce different kinds of party line systems.

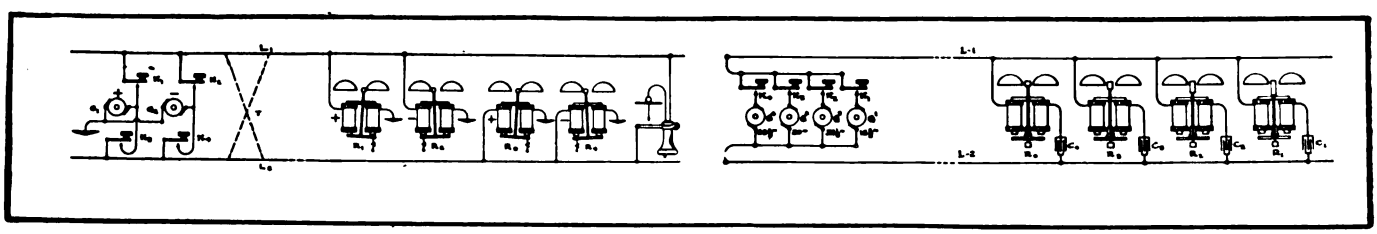
If a committee of telephone engineers were asked to decide the question as to what things were most desirable in a party line system, their report would be as follows: No earth connections, no relays, no adjustable springs or weights, no step by step mechanisms, and that the ringing of the bells should not be appreciably affected by the capacity or resistance of the line. The only way that such a specification could be satisfied would be to have bells whose operation depends upon mechanical tuning.

In order to bring out clearly the advantages of a system using clean metallic circuits, as compared with those using earth connections, it will be necessary to describe briefly the latter.

Referring to Fig. 2, we have represented a subscriber's telephone line consisting of wires L-1 and L-2. Connected to earth from L-1 line are the bells 1 and 2; connected to earth from the L-2 line are the bells 3 and 4; bells 1 and 3 are responsive to pulsating currents of positive sign and bells 2 and 4 to pulsating currents of negative sign. Generator G-1 furnishes pulsating current of positive sign and generator G-2 pulsating current of

Fig. 2. Connections on party line where bells are rung by pulsating current flowing to ground.

Fig. 3. Connections for bells and source of ringing current in harmonic system.



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negative sign. The switches, K-1, K-2, K-3 and K-4, are provided at the central office for connecting current of the proper kind to line.

When we consider a system such as that illustrated in Fig. 2, we find that the following objections are present; on account of the presence of earth connections at the sub-stations, the lines are susceptible to bad inductive disturbances, due to electric railway, alternating power and lighting circuits and telegraph. It is apparent that, in order that subscribers be rung selectively, each bell shall be connected to the proper side of line. In other words, the operator, when she wishes to ring stations 1 and 2, projects either positive or negative pulsating current on to the L-1 half of the metallic circuit, and when she wishes to call station 3 or 4, she connects plus or minus current to the L-2 side of the line.

Now, if a line be transposed, say at T, to prevent inductive troubles, or if the wire chief at the central office happens to get a jumper reversed in the process of making a cross connection on the distributing frames, the currents sent out would go to the wrong side of the line, and a wrong subscriber be called, thus causing endless trouble. This class of faults is constantly occurring to my knowledge.

In installing telephones in a system such as Fig. 2, the installer is always obliged to locate accurately the proper side of the line before connecting it to the telephone, which operation entails expense and chances for mistakes. When an operator in this system rings a subscriber, say No. 4, with the minus pulsating current, and during the process of ringing the subscriber removes his receiver from the telephone hook, part of the current is carried over to the other half of the line and the bell connected to it which responds to like current (No. 2) will consequently give a false ring.

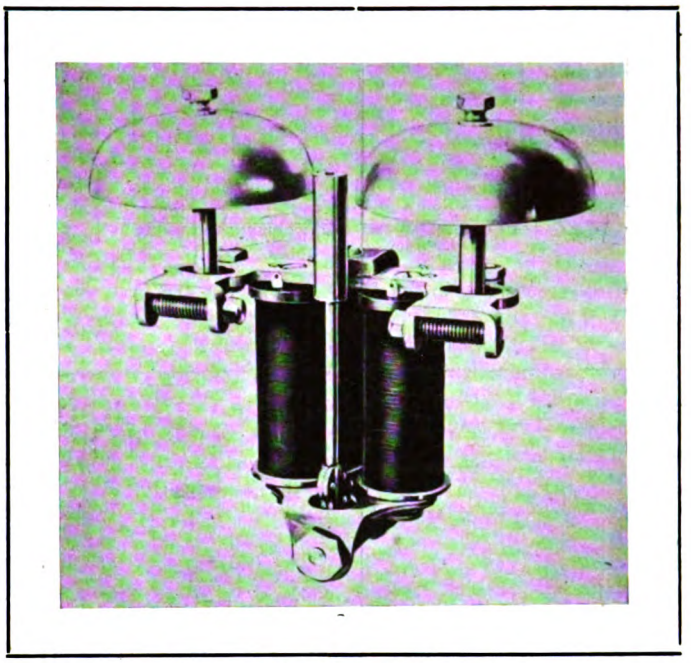

Fig. 4. Harmonic party line ringer.

G-3 and G-4 are generators designed to ring them. K-1, K-2, K-3 and K-4 are switches used by the operator for connecting the currents of proper frequency to line. It is evident that no transposition of the line at any point or of the terminals of the instruments can affect the operation of this kind of a system, and in as much as each bell responds to an entirely different current, no "cross rings" can be produced by the removal of the receiver during the process of ringing. It is also evident that when telephones are being installed, they can be connected to the line without care or reference to polarity, in the same manner that incandescent lamps are connected to a lighting circuit.

Two of the first problems that present themselves in designing a harmonic party line system are the selection of currents of proper frequencies and voltages and the method of producing them. Elisha Gray found, during his experiments with the harmonic telegraph, that frequencies which were related in a ratio of 1, 3, 5, 7 and 9 produced the least interference. It is evident that to produce currents whose frequencies are related in the above manner it would be necessary, if one driving motor were used, to employ belted or geared transmission, which is not desirable. It was found that currents whose frequencies were related in a ratio of 1, 2, 3 and 4 were sufficiently non-interfering for commercial purposes. Currents with frequencies of 2,000, 4,000, 6,000 and 8,000 were finally adopted and were generated by a set which consisted of a motor direct connected to 2, 4, 6 and 8 pole generators, the whole outfit running at a speed of 1,000 revolutions per minute. A set of this kind is illustrated in Fig. 7. It was found by experiment that high frequency bells required more power to operate them than the low frequency ones, and consequently it was found necessary to step up the voltages of the generators as the frequency increased. The voltages which were finally found to be the best were for 16 2-3 cycles, 60 volts; for 33 1-3 cycles, 100 volts; for 50 cycles, 135 volts, and for 66 2-3 cycles, 180 volts. These harmonic ringing sets are provided with a governor by means of which the speed of the motor is kept constant regardless of the variations of voltage in the power circuit.

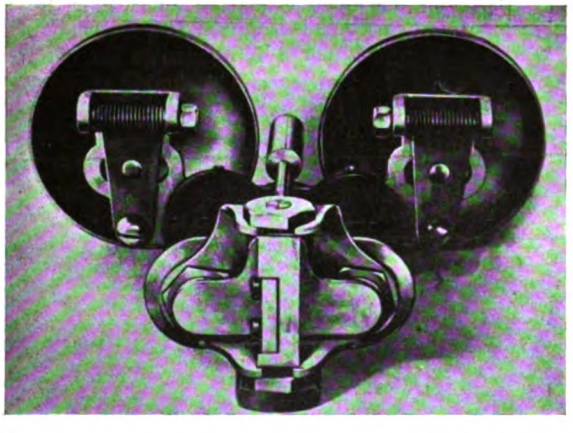

Fig. 5. Another view of the ringer shown in Fig. 4.

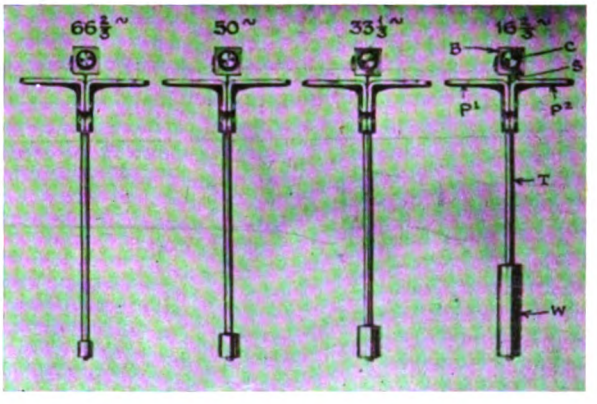

Fig. 6. Armatures and tappers for currents of different frequencies.

Now we come to the description of a modern harmonic selective system. Referring to Fig. 3, L-1 and L-2 represent the two sides of a metallic circuit telephone line. R-1, R-2, R-3 and R-4 are mechanically tuned telephone bells, each having connected in series with it a one M. F. condenser across the line. G-1, G-2,

Editor's Note: This paper was presented at the meeting of the Pittsburg section of the American Institute of Elecrical Engineers, March 13, 1906.

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We now come to the design of the harmonic bell itself. The following points are essential to a successful harmonic ringer: Its armature must be in perfect tune with the current designed to operate it; it must remain in tune, after once leaving the factory, indefinitely; it must be interchangeable with the ordinary single party telephone ringer, for the reason that a great many of the operating companies find it necessary to change over their old to the new system; it is desirable that the general appearance of the ringer after being installed be the same as that of the ordinary single party ringer, it being sometimes desirable that the telephone users be in ignorance of whether other subscribers are using party or single line service.

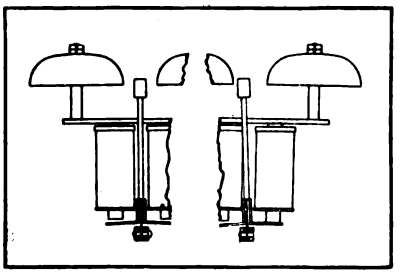

Fig. 10. Normal and ringing positions of harmonic bell tapper.

Figs. 4 and 5 represent a modern harmonic party line ringer. The design of this ringer is very similar to the ordinary telephone ringer with the exception that all of its parts are more massive. The principle difference lies in the fact that its armature is mounted upon a spring instead of being pivoted. The construction and mounting of the armature are shown more clearly in Figs. 6, 8 and 9. Each complete armature consists of two punchings P-1 and P-2, a flat steel spring S, a steel tapper rod T, a weight W, and the mounting block B. In riveting together the punchings P-1 and P-2, the lower end of the mounting spring S and the upper end of the tapper rod T are firmly attached to the armature as a whole. The part of the tapper rod which is fastened between the punchings is knurled so that it will not slip. The upper part of the mounting spring S is clamped between the block B and plate D, which are fastened together by means of two heavy iron rivets. All the riveting in connection with the armature is done in a power press in order that the highest possible rigidity may be obtained for the completed article. The block B is provided at its two ends with threaded trunnions C, designed to fit into the slots X of the ringer yoke. After the block B has been slipped into place it is held by the clamping of two heavy nuts provided on its trunnions. It was found necessary to make the tapper rod T very much more rigid than that used in the ordinary ringer for the reason that, if it were not so false vibrations would be set up in the tapper rod between the weight W and the armature. In the manufacture of the spring S, special spring steel is purchased in the shape of long ribbons of the proper thickness and width, similar to heavy clock spring, and then cut up and perforated in an ordinary punch press. It was found necessary, as shown in the accompanying illustrations, to provide these ringers with a very massive micrometer adjustment for the gongs, otherwise the heavy tapper weights would batter back the gongs out of adjustment during the process of ringing.

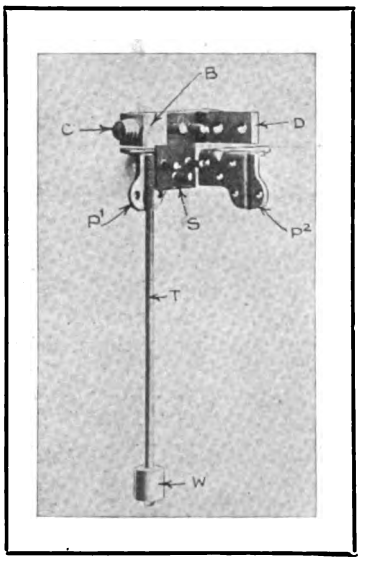

Fig. 8. Isolated armature and tapper of harmonic ringer.

The method of tuning these ringers is as follows: A set of standard adjusting weights, exactly similar to those shown in Fig. 6 with the exception that they are provided with small set screws to clamp them to the tapper rod, are used. The bell to be tuned, minus the gongs, is clamped in a very rigid frame and a very weak current of proper frequency is applied to its electromagnet. On account of the current being extremely weak, the armature will not operate unless it be in absolute tune with it. The tuner raises and lowers the tuning weight until a position is reached in which the armature vibrates violently; when the weight is in this position he knows that the armature is in tune. He then scratches the tapper rod at the upper end of the weight with a small file, and removing the testing weight, he pushes on an exactly similar one by means of a small press provided for this purpose. It can be seen that by this construction there are absolutely no adjustments to be tampered with by unskilled labor. A steel wrench is furnished for the different nuts of the ringer, so that there is no excuse for the telephone repairmen using their pliers on them. The assembled armature is now slipped into place and clamped in the proper position by means of the nuts *C*, Figs. 8 and 9. A proper air gap between the magnet pole piece and the armature is obtained by raising and lowering the yoke which supports the armature. This is done by means of adjusting nuts threaded over the magnet cores as shown in the accompanying illustrations. The gongs are not placed in position on their posts until the bell is mounted in the telephone box. In fact the bell will operate as a buzzer without the gongs, thereby showing that its proper work is not dependent upon their presence or absence. The armature and tapper rod normally stand in the central position with reference to the pole pieces of the magnets and gongs (Fig. 10). On account of the normal position of the armature, with maximum air gaps, giving a minimum magnetic pull, it will not be affected unless the energizing currents are in exact tune with it. When the proper current is thrown on to the line the ball will be thrown into violent vibration, and the ends of the armature brought into contact with the pole pieces, which are bare. The armature in this position is very strongly attracted and comes to a sudden stop on the pole pieces. The gongs are so adjusted that the tapper ball will have to spring about one thirty-second of an inch in order to hit them. When the armature is alternately coming into contact with the two pole pieces of the permanent magnets, the magnetic pull is so great that it is impossible for the striking of the gongs to throw it out of tune. The ringing position of the bell is shown at the right in Fig. 10.

It is a well-known fact that a device in tune with the energizing force is many times more efficient than one which is not. In working with these absolutely tuned bells I have found that they can be constructed to give any desired degree of sensitiveness.

(To be continued.)

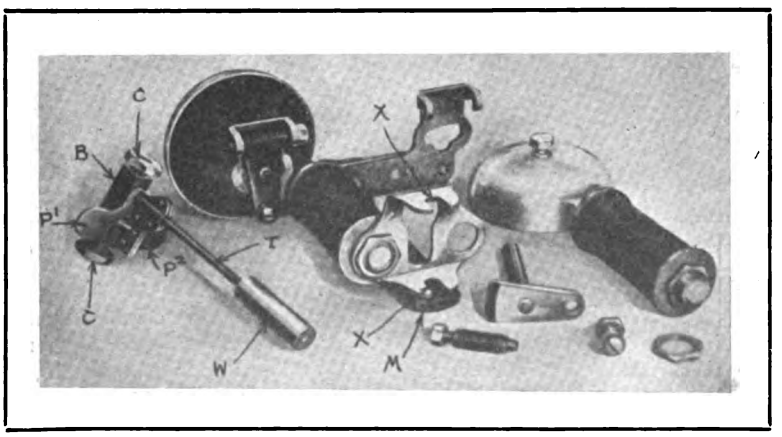

Fig. 9. Harmonic ringer disassembled to show parts entering into its construction.

TELEPHONES ON THE U. P. RY.

AT a recent meeting of officials of the Union Pacific Railway, held at Omaha, Mr. L. H. Korty, superintendent of telephones and telegraphs, read a paper describing the advantages obtained from the use of the telephone in railway operation.

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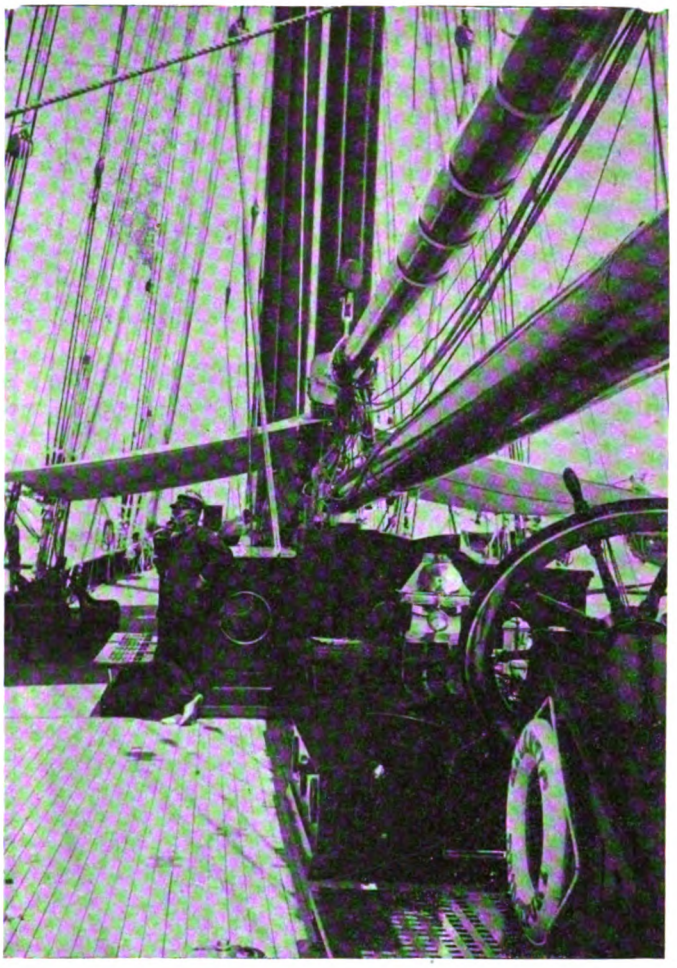
The Telephone on the Kaiser's Cup Winner

By E. A. Tyler.

PASSING through the Long Island Sound a traveller from New York to Boston will be treated to an aquatic show unequalled in any other part of the world. Scattered along the shores are innumerable yacht clubs and the waters of the sound are dotted with pleasure craft of every description from the handy little cat boat to the majestic steam yacht. Of all the vessels there is none which arouses as much curiosity and pride as a long black three masted schooner anchored off Larchmont. An inquiry will elicit the information that it is the "Atlantic," the champion ocean racing yacht of the world. Unlike the contestants for the America's cup, which are practically racing machines, this vessel is a pleasure craft in the true sense of the word. Within her capacious interior the voyager can enjoy the comforts of the finest hotel on shore and, when breezes blow and her white wings are spread she can show her heels to any boat unable to maintain a speed of fully fifteen knots. Her record for twenty-four hours' sailing is 341 miles, which is a remarkable accomplishment. Not so many years ago it would have been a record for an ocean liner and even to-day there are many large steamers that do not make greater speed. As an eloquent proof of her ability to uphold the honor of the country whose flag she bears, the beautiful gold cup given by the German Kaiser to the winner of last year's race across the Atlantic may be seen in the centre of the main cabin; while the sideboard in the breakfast room is loaded down with smaller trophies won against the pick of the yachting fleets of the world.



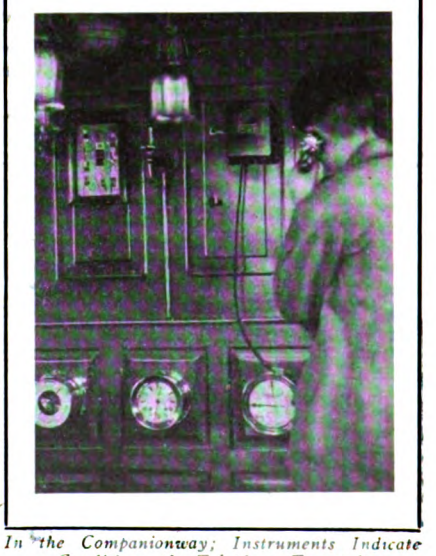
The Deck of the Atlantic, the Champion Ocean Racing Yacht of the World.

A few statistics relative to this boat may prove of interest. The length of the boat over all is 189 feet and 135 feet on the water line. Her extreme beam is 29 feet and she draws 18 feet of water on an even keel. The gross weight is 303 tons. Her rig is that of a three masted schooner and in full dress upwards of 22,000 feet of canvas are spread to catch the breeze. In calm weather an auxiliary triple expansion engine of 300 H. P. will drive her through the water at a speed of 9.5 knots and sufficient coal can be carried to enable her to steam for six days. A 10 K. W. direct connected dynamo furnishes the current for lighting purposes and also for electric heating appliances.

One of the first things which meets the eye of the visitor as he descends from the deck to the main saloon is an intercommunicating telephone mounted on the wall above the head of the companionway. When he reaches his cabin he will find another instrument conveniently placed near the side of his bed so that in case he is subjected to an attack of sea sickness he can without leaving his bed reach over and grasp the hand micro-telephone and talk with the steward or whomever he desires. This system is one of the particularly interesting features of the yacht, since it gives evidence of the forethought expended upon the details which are so essential for the comfort of the owner and his guests when on board. Connections to the engine room and other places furnish valuable assistance to the crew in their work.

For the Steward's Department the Use of the Telephone is Frequent.

The equipment was furnished and designed by the firm of Lambert-Schmidt, of New York, and possesses several features of more than passing interest. The switching mechanism is contained in a rectangular oxidized copper case provided with a knurled knob on one side for switching purposes and a small opening in the front through which appears the number of the station being called. Thus, if station 3 were to call station 5 the knob would be revolved till the figure 5 appeared in the opening. When the hand set is



In the Companionway; Instruments Indicate Conditions, the Telephone Transmits Owner's Orders.

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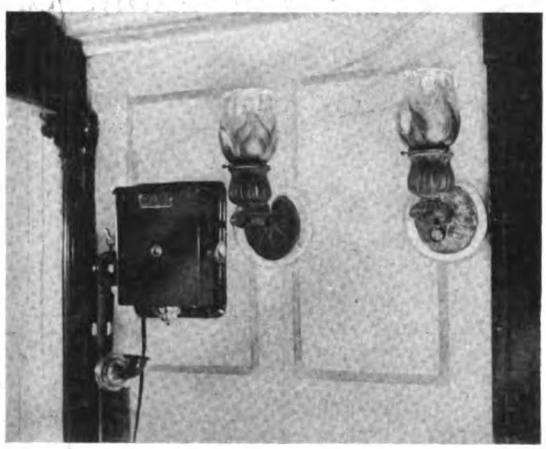
replaced on the hook the mechanism is reset and the number of the home station is then disclosed. In all there are seven stations located, one each, as follows: Owner's room, guest's room, captain's and engineer's cabins, pantry, engine room and companion way. Separate common batteries are employed for ringing and talking purposes and these are arranged in duplicate, so that in case one set gives out the other can be immediately cut in service. The wires are run concealed and are protected against moisture by waterproof insulation. In fact, every precaution has been taken to prevent interruption to the service. This telephone system, as can readily be imagined, enters very largely into the social and official life on board. It saves time and places the officers and owners in direct touch and at the same time enables the guests to enjoy the facilities that form a part of the appointments in any exceptionally comfortable residence or club ashore.

For aid in navigating the vessel along the shore and in the harbors a submarine signal equipment is installed. This consists of two sound transmitters located on either side of the bow within the hull and connected to an observation station in the chart room. This instrument is provided with two receivers and the necessary switching keys for controlling the circuits from the transmitters.

When entering a harbor at night or during foggy weather a man is stationed at the observation instrument to listen for the signals emitted by submarine bells located by the Government on dangerous reefs. By switching from one circuit to the other from time to time it is possible to detect the slightest sound, and as the transmitter on the side of the vessel nearer the bell will send a stronger signal than the other, the location of the danger point is readily determined.

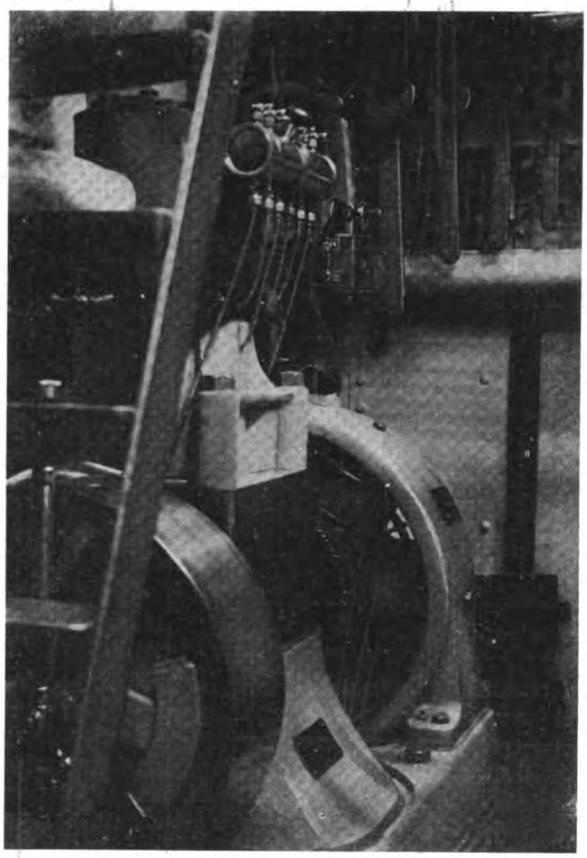
The crew of the Atlantic consists of thirty-one men, distributed as follows: 3 officers, 2 engineers, 2 firemen, 2 cooks, 1 messman, 14 sailors, 2 quartermasters, 4 cabin stewards and 1 bugler. For the accommodation of the



Conveniently Located Telephone in Owner's Cabin.

owner and his guests there are two double rooms and three single ones, together with three bathrooms. Then there is a breakfast room, cabin saloon, pantry and storeroom.

In the capacious ice chest, which requires six tons to fill it, sufficient fresh provisions can be carried for an extended voyage. Every appliance for the convenience and comfort of the owner and his guests is to be found on board and it is safe to say that no other yacht excels the Atlantic from the standpoint of luxury and ease. Her owner, Commodore Wilson Marshall, of the Larchmont Yacht Club has a boat which should satisfy every requirement of the thorough sportsman and genuine lover of the pleasures of yatching.



Member of Atlantic's Crew Listening for Warning of Submarine Bell.

A Telephone Supplies a Method of Communicating with the Engineer.

IMPORTANT CONSOLIDATION OF INDEPENDENT LINES IN N. DAKOTA.

ANNOUNCEMENT has just been made of the consolidation of most of the important Independent telephone companies in North Dakota and the organization of the North Dakota Independent Telephone Company with its principal headquarters in Fargo. The stockholders of the new company are said to be leading bankers and business men of the State, who believe in keeping their profits at home and who propose to give the rival interests an experience with organized and vigorous competition.

The company begins business with about 1,000 miles of toll lines and is proceeding to build standard copper lines to connect all parts of the State, and in the near future expects to have connections with every city, town and village in North Dakota.

The companies making up the North Dakota Independent Telephone system, up to this time, are as follows:

The system from Aneta to Casselton, with exchanges at Hope, Finley, Page, Sharon, Colgate and Ayr, with connecting lines to Clifford, Portland, Erie, Mason, Ripon, Mayville, Galesburg and Rosevillé; also the exchange at Casselton with lines to Fleming, Amenia, Howes and Saxony.

Exchanges at Valley City, Leal, Roger, Sanborn, Fingal, Hast-

(Continued on page 27.)

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QUERIES

OPERATOR'S LOAD.—(723.)

Will you please tell me how many calls an operator in a common battery exchange can handle in a rush time? J. B.

A moderately heavy load for an operator in the busiest time of the day is considered to be about 225 calls per hour. This presumes that there is good team work, so that when calls come into one operator for a few minutes more rapidly than this rate the adjacent position will help out. This, however, is too heavy a load to be sustained for any very great time. It is no uncommon thing in a very large and well conducted exchange for the lines to be so arranged that on exceptionally busy days the load for an hour at some one or two positions will run up to 300 calls, or even a few more. It has been found that a good operator can stand this during the time which it lasts. If connections are so arranged that this load will be sustained too long, however, it has been found that the service suffers, as would naturally be expected when imposing too severe a load upon one individual.

REPAIRING COMMUTATORS.—(724.)

Although our generators have been in use only about a year the commutators are very uneven and rough, and the brushes spark badly. Please tell us if there is any remedy for this condition which can be easily applied. J. N.

The only remedy for the condition you mention seems to be to turn down the commutator in a lathe, to give it a cylindrical form and smooth surface. If you have no spare machine the manufacturers will doubtless be able to ship you a second-hand armature of proper dimensions to insert in the generator while the regular one is being repaired, in case you find it necessary to send it away from your own city.

After the armature has been properly repaired and set in place careful attention should be paid to the adjustment of brushes, not only as to postition but as to tension. It is only by constant care that a commutator can be kept in good condition, and especially in a telephone exchange, it is one of the most essential points to be observed when good results are desired.

WIRES RUN IN TWISTED PAIRS.—(725.)

Our office is so arranged that it is necessary to run battery wires for transmitter supply to a magneto switchboard in a location where it would be difficult to conceal them. As they can be made up into a much neater cable if run straight than is possible with twisted pairs we would like to do this if it will introduce no difficulty. Will you please tell us how far wires may be run together without twisting before cross talk is noticed between two circuits? L. C.

The distance depends upon various conditions, such as the character of the insulation and its thickness, and a few other things; but it is sufficient to say that when wires forming both sides of a circuit are run untwisted beside another pair for only a few feet serious cross talk will be introduced in the switchboard. This is especially true of wires forming a primary talking circuit in a magneto board. Wires forming separate pairs should be twisted throughout their entire length, even if it is necessary to sacrifice appearances.

CONVERTIBLE TRUNK CIRCUIT.—(726.)

Will you kindly explain to me the nature of a convertible trunk? L. C.

The term convertible trunk is applied to a trunk line which may be operated either on a call wire or a ring-down system; that is to to say, a single line is brought to a switching key, by means of which connection may be made with either one of two sets of terminal apparatus. One set comprises a cord and plug and with proper associated circuits. This cord and plug is placed in front of an operator at an incoming trunk position, and the line is handled by this operator upon receipt of orders over a call wire.

This arrangement is usually kept in service during those parts of the day when traffic is heaviest. During the remainder of the day, or more especially during the night, the line is connected upon the throwing of the key, to a terminal circuit including a ring-down relay and regular answering jack and lamp located in front of a position equipped with subscriber's operator's cord circuits. It is then handled in the same way as any other ring-down line.

AUTOMATIC DISCONNECTION OF REPEATING COIL.—(727.)

Will you please explain to me how a circuit is arranged so that a repeating coil is automatically cut out when a cord circuit is used between two toll lines, although retained in the circuit when connection is to be between a toll and a local line? N. G.

In the accompanying diagram, Fig. 727, are shown the essential features of a circuit in which the result you mention is accomplished. The repeating coil is wired to the contacts A A, C C of a relay, the winding of which is connected in the sleeve circuit of one cord. It will be observed that with the relay in the unoperated position, as shown, transmission takes place through the repeating coil, contacts C C being free from connection with the armature of the relays. This is the condition when the cord is used in connection with a local line, as the relay does not receive a sufficient current to operate it when connected to such a line.

The toll lines are terminated in jacks which have connected to their sleeves through appropriate resistance battery of a polarity which will operate the relay controlling the repeating

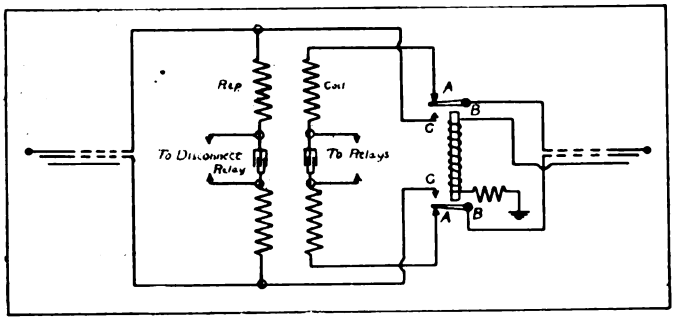

Fig. 727.

coil circuit. Therefore, upon the insertion of the plug in such a line the two armatures are pulled up, contacts A A are broken, and the line carried through to the other plug over a direct metallic path which includes the contacts *C C*. It will be observed that although one side of the repeating coil remains bridged across the cord this introduces no undesirable shunt, as the high impedance disconnect relay, shunted by a condenser, is included between its two divisions.

FUSING OF POWER LEADS.—(728.)

In laying out a wiring system how is the proper size of fuses determined? J. C.

Many special features arise in practice which make it necessary to fix the carrying capacity of fuses in some circuits as determined by past experience. Such a case is the fusing of leads to induction motors, as mentioned in the reply to a recent query. The practice in regard to fusing battery leads depends upon the size of the cells, rather than the size of the wire, which is usually installed to take care of ultimate, rather than present requirements. Other circuits are fused with the idea of preventing damage from certain abnormal conditions which have no direct relation to the size of wire.

In general, however, the size of fuse should not be greater than that determined by the dimensions of the wire, and its carrying capacity, as fixed in the underwriters' rules.

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THE EDITOR'S PAGE

GLIDDEN, THE PROPHET (?).

TELEPHONE men, both Bell and Independent, are considerably amused by the interviews from Charles J. Glidden which have been going the rounds of the daily press the past few days. Mr. Glidden has stopped in his automobile tour of the world long enough to express the views which he holds at this particular moment regarding the telephone monopoly, and, as may be expected, says that he fears for the success of Independent companies.

Mr. Glidden, however, does not confine himself wholly to the results of competition and its features which he claims to be so discouraging to the general public, but is quoted on certain financial considerations affecting the telephone business. He is said to have given his reasons for believing that few Independent telephone systems are making money, etc., etc.

Those who were following the telephone business a few years ago say that if anyone knows when a company is likely to go to pieces it should be Glidden. Under his management the Michigan company was put in such condition that it had to go into the hands of a receiver, the Erie was wrecked, and others suffered greatly. Shortly after his sudden departure from the field it was reported that his personal affairs were so arranged that he did not suffer for want of money his companies so greatly lacked, and there were not many telephone men who did not believe in his skill as a financial juggler.

There are few persons in whom silence with regard to telephone matters would be more becoming. His absence from the country for a few years does not cause people to forget his past connections, and the printing of interviews on the telephone situation is a poor joke on the public when they come from the celebrated Glidden.

WORKMANSHIP IN PRIVATE TELEPHONE INSTALLATIONS.

WHAT contributes more than any other single thing to the prosperity of the firm which takes up successfully the installation of private telephone systems is good workmanship. It goes without saying that a concern which expects to remain in business permanently will endeavor to obtain good apparatus—well designed and and substantially built. This is not a difficult thing to do. The use of cable formerly introduced a number of troubles which were likely to be of a nature almost ineradicable, or at least of a sort most perplexing to the unfortunate persons entrusted with the task of making the systems work. Nowadays, however, the great improvements which have been made in the methods of manufacturing cable have made it possible to secure a connecting system which is practically perfect. Although it was formerly difficult to obtain cable for interior use which would not develop cross talk even with twisted pair circuits, at the present time little difficulty need be apprehended from this cause.

The inherent and positive difficulties which were present in the material as it came to the installer have been to a large extent remedied in the natural progress of the art. The only things which now appear to offer any serious obstacle to his complete success are those conditions which are in a most direct way related to the carrying on of his own business. Chief amongst these are the difficulties which prevent the men directly engaged in the work from installing the material in accordance with the requirements of high class mechanical workmanship. This seems to be due in a measure to the fact that although this class of work, judged by its results, at first glance appears simple, it is likely to demand skilled work such as is ordinarily furnished by men engaged in a number of trades, each demanding more or less skill and experience. Here as in the other branches of telephone work, the lack of sufficient experienced men to supply the demand is felt. There has hardly been time to impart the necessary electrical training to the men fitted to handle the balance.

In the first place it is necessary that the persons doing this class of work should have a general knowledge of the layouts of buildings and methods employed in constructing them. Failure to proceed in accordance with such knowledge not only makes it impossible for the employee to accomplish a sufficient amount of work, but it is liable to cause damage to property which will be expensive, not only directly but from the effect it produces when other business is sought in the future. It is surprising how rapidly news of a little bit of carelessness will travel sometimes.

Then the various features of arrangement very often make it necessary that the installers should be able to turn out a very fair job of woodwork, perhaps upon a piece of interior finishing that is located in a place where it is not easy to handle. Not only is it necessary to work with the wood, but stains, paints and varnishes must be applied. It does not pay for the man who puts in the telephones to make a poor job of any of these things.

Then, more important than all the rest, is the work which demands the careful supervision of a skilful electrician. In telephone exchanges the careful testing which is usually undertaken before a plant is cut into service is likely to reveal faults before actual operation is started. In private systems it is a regrettable fact that thorough testing is all too often omitted. Faults are absent only in proportion to the skill expended by the installers and the carefulness of supervision during the progress of the work. Where there are so many connections as are necessarily found in such systems the utmost attention must be paid to the neat arrangement of wires, the making of substantial terminal connections, and the numbering of circuits at all points where they are accessible, in order to facilitate their location at times when repairs or changes are made necessary. Observance of these requirements has always been found to assist in the upbuilding of a substantial business to an extent which deservedly emphasizes its importance.

WAR ON TELEPHONE COMPANY'S "PIPES" IN BROOKLYN.

BACK-YARD fences may furnish an economical support for telephone wires sometimes, but just now their use in Brooklyn, N. Y., is causing some annoyance to the telephone company, perhaps more to a few residents, and incidentally furnishing the local newspapers with "copy" of a most interesting variety.

It is related that on a certain day, when nearly all the men were away from home at their work, the telephone linemen "began stringing a lead pipe along on the back fences," whereupon the women in the houses "flocked into the back yards, protesting." Nor were the linemen content with the mere "stringing" of the "pipe," for when one of the residents, whose name is gravely furnished, made known her objections the foreman offered to "send downtown to her husband's office to get his consent to the stringing of the wires."

Confiding in this promise the wife ceased to protest, and went out to do some shopping. Work must have gone smoothly, for on her return the cable was in place. The people threaten to go to court, but the company will probably keep on stringing.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

RAILROAD RIGHTS OF WAY CANNOT BE OCCUPIED WITHOUT OWNER'S CONSENT.

Telephone and telegraph companies have the right, by a statute of the United States, to construct and maintain their lines over all post roads of the United States. Does not this give them the right to occupy the right of way of a railroad company which carries the mails in spite of its refusal to consent thereto? U. T. C.

THE statute does not authorize telephone companies to enter upon private property, even of railroad companies, without the consent of the owner. It provides that, whenever the consent of the owner is obtained, no state legislation shall prevent the occupation of post roads for telegraph purposes by such corporations as are willing to avail themselves of its privileges. No compulsory proceedings are authorized. W. U. Tel. Co., v. Ann Harbor R. Co., 90 F. 379; Pensacola Tel. Co. v. W. U. Tel. Co., 96 N. S. 1, 11.

COMPANY'S DUTY WHEN WIRE FALLS IN THE STREET.

When telephone lines fall in the street as a result of a storm or other cause over which the company has no control, can the company be held liable for injuries to a passerby who ran into the wires before the company knew they were down or had time to fix them? H. M. G.

IT does not become the duty of a telephone company to remove or repair the wires until it has had notice and a reasonable time to make the repairs. Upon receiving notice it should make the repairs with all the speed possible, and if it does not complete them in a reasonable time, it is liable in damages to any person who suffers injury as a result.

CONTEST OVER INTRODUCTION OF NICKEL-IN-THE-SLOT TELEPHONES.

F. S. ALDRICH, a druggist at Des Moines, Iowa, has secured a temporary injunction restraining the Mutual Telephone Company from refusing to lease him a telephone. He alleges that the company discontinued his service while he had a verbal contract with the company for a telephone at $42 per year. The telephone, according to the petitioner, was taken out because he would not allow a nickel-in-the-slot attachment to be connected with his instrument. He desired a free telephone in his store because it brought him business.

RECOVERY FOR MENTAL ANGUISH IN CASE OF NON-DELIVERY OF A TELEPHONE MESSAGE.

IN October, 1904, a telephone message was sent over the wires of the Cumberland Telephone & Telegraph Company to Alice Atherton at Bardwell, Ky. Mrs. Atherton did not live at Bardwell, but at Cunningham, a village about ten miles distant, and to which there was no telephone line from Bardwell. The company's manager at Bardwell agreed with the sender of the message to deliver it for $2, which was paid. The message was written out, enclosed in an envelope and delivered to a special carrier employed by the company for that purpose. The carrier drove to Cunningham and found that the person to whom the message was intended was on a visit some ten miles away. The carrier did not deliver it nor report to the sender that he was unable to deliver it. Before Mrs. Atherton learned that her sister was dying it was too late to reach her bedside.

Mrs. Atherton brought suit to recover from the telephone company for her mental anguish, on account of the breach of its contract, whereby she was deprived of seeing her sister before she died and attending her funeral. She recovered a judgment for $300, but the company carried the case to the court of appeals of Kentucky, where it was reversed.

In its decision the court held that the rule which is applied to cases against telegraph companies for non-delivery of messages, allowing a recovery for mental anguish, applies with equal reason to telephone companies. It was pointed out that the contract of the company was not to deliver the message unconditionally, or, at all events, but to deliver at Cunningham. Cumberland Telephone & Telegraph Co. v. Atherton, 91 S. W. 257.

TELEPHONE COMPANY SEEKS INJUNCTION PREVENTING ANNOYANCE BY PHONOGRAPH.

THE Home Telephone Company, of Canal Dover, Ohio, has sued for a temporary injunction restraining the proprietor of a moving picture show from operating a large phonograph near the entrance of his place of business. The company alleges its operators are unable to give proper attention to their work and the service is otherwise affected by the music.

RIGHT OF SUBSCRIBER WHO FAILS TO GET AN ANSWER.

I would be glad to have you answer the following query, in your legal column. A subscriber living a short distance from town recently had a case of sickness in his family during the night, and failing to get an answer from the operator, was compelled to send a messenger for a physician. The trouble was reported early the next morning, and it was found that the armature had worked tight, and the drop shutter failing to fall, did not ring night bell. The same had been working satisfactorily early in the night. The trouble was cleared promptly.

Suit has been threatened if there is a like occurrence. It appears that extraordinary diligence would have to be used to avoid the above, especially on small exchanges using magneto boards. C. L. O.

IF the above occurrence could have been prevented by ordinary diligence upon the part of the telephone company, the subscriber would have a right of action for whatever damages he suffered from being unable to get an answer from the operator. Whether it could have been prevented by ordinary diligence or whether it would have required extraordinary diligence to avoid the occurrence would be a question for a jury to determine from all the evidence in the case.

LINEMEN MUST INSPECT POLES TO ASCERTAIN THEIR SAFETY.

THE Court of Appeals of Kentucky has reversed a judgment obtained by John W. Holtby against the Western Union Telegraph Company for damages sustained in removing a wire from defective poles to new ones. On the trial of the case the plaintiff was asked if it would not have been possible for him, by inspecting the pole, to ascertain if it were safe to climb. It was held to be an error not to have permitted this question to have been answered. The telephone company had the right, so the court says, to prove by the plaintiff that an inspection of the pole would have disclosed its unsafe condition. The court decided that upon a retrial of the case the jury should be told to find for the company if they believed that the plaintiff under his employment undertook to inspect the poles before climbing them to ascertain whether or not they were dangerous, and that an inspection of them would have disclosed the fact that they were unsafe.

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IN THE OPERATING FIELD

SUCCESSFUL OPERATION OF SIMULTANEOUS TELEPHONE AND TELEGRAPH LINE, 1,400 MILES LONG.

THE Canadian Pacific Railroad has installed a special copper wire between Montreal and Winnipeg, a distance of 1,430 miles, touching only Fort William and North Bay, for its telegraphone system, by means of which two messages—one by telephone and the other by telegraph—can be transmitted over the wire at the same time. A number of tests have been made at both Montreal and Winnipeg and the operators at each end were able to converse with those at the other, and in the meantime the operators at Fort William were sending a message by telegraph over the wire to Montreal, thus proving the success of the new system. The Canadian Pacific Railroad officials think the wire will work just as well at a still greater distance. One man prominent in the management has said: "The introduction of a long distance telephone in connection with a railway opens up great possibilities. It will be a boon to the heads of departments who wish to converse with other departments hundreds of miles away. It will eliminate the long "service" messages which so frequently tie up the wires. For the operating of trains it will be invaluable and will revolutionize the work of dispatchers.

The company intends to install the system along all its lines as soon as jossible. At the present time it is understood the company will have telephones installed in Fort William, North Bay, Montreal and Winnipeg, and there the officials will have to go when they want to talk, but it is the intention of the company to have the instruments installed in all the principal offices at an early date. The company is now stringing a similar wire between Winnipeg and the Pacific coast terminus at Vancouver.

NEWLY ORGANIZED INDEPENDENT COMPANY AT BEATTYVILLE, KY., WILL EXTEND PURCHASED LINES.

THE Home Telephone Company, recently organized at Beattyville, Kentucky, has bought out the Eastern Kentucky Telephone Company's plant, which has been in operation about five years. The new company has a capital stock of $5,000, to be increased to $10,000 at the option of the stockholders.

The incorporators are G. W. Cann, J. W. Steele, T. B. Blakey, J. C. Richardson and M. McDonald.

A new line will at once be built to Irvine, Estill County, where long distance connections can be secured. The result of this transaction will be a material improvement in facilities for communication with the large number of subscribers on Independent lines in other parts of the State.

RELATIVE VALUE OF THE TWO SYSTEMS OPERATING IN ST. JOSEPH COUNTY, IND.

COMPARATIVE figures in St. Joseph County, Ind., where the Home Telephone Company, of South Bend, operates important exchanges, show a most interesting situation. Last year on July 1 in South Bend there were 878 Bell subscribers and 2,718 Independent; while at Mishawaka there were 114 Bell subscribers and 560 Independent subscribers; furthermore, although only these two exchanges were operated by the Bell Company, the Home Company gave service to New Carlisle, River Park and Granger. During the past year the business of both companies has grown, but that of the Bell has only increased to 1,203 telephones, without the addition of any more exchanges, while the Independent company now operates 8 exchanges with a total subscribers' list of 4,544 telephones. In South Bend alone the number has increased somewhat over 10 per cent., although development before this time was good. A very large growth has been made in rural districts, the number of farmers' connections having been more than doubled.

AN ADVERTISING SUGGESTION.

AN advertising blotter which will "stay put" on the desks of his subscribers is something which is eagerly sought for by every energetic telephone manager. Each one must have an attractive design, but the accompanying verse suggested by L. A. Herrick, manager of the Stephenson County Telephone Company, Freeport, Ill., gives a little more:

The New Telephone.

As a door that swings to and fro
Makes it easy to come and easy to go,
Friendly acquaintance makes half of a trade,
The other half depends upon how it is made.
Our long distance telephone brings 10,000 or more
Trips, visits or orders right to your door.

INDEPENDENT COMPANY MAKING VIGOROUS FIGHT FOR FRANCHISE IN KALAMAZOO.

IN the city of Kalamazoo, Mich., attempts to obtain rights to build a telephone system to connect with the other Independent lines in the state are being made at the present time. The movement is being conducted vigorously, and a thorough attempt is being made to inform the people in the town of the advantages of competition in telephone service. The granting of a franchise here will enable connections to be established with Independent lines, to the mutual advantage of the city and the people outside, who have for a long time been anxious to connect with the business firms of the city.

INDEPENDENT COMPANY AT ROSEVILLE, ILL., PREPARING FOR INCREASED BUSINESS DURING THE COMING YEAR.

AT the annual meeting of the Roseville Telephone Company, which was recently held, it was determined to enlarge the plant to prepare for handling the rapidly growing business of the company in the most efficient manner. The exchange is of considerable size, and has been doing a good business during the past year. This will be much increased, however, by facilities for connection with Iowa, which will be opened up when the new line to Burlington has been completed. The construction of this line depends upon the building of towers for the river crossing, which has been delayed owing to various reasons for a considerably longer time than was expected. When the work has been completed, however, the toll service of the local company will be greatly extended and improved, owing to the ability to connect with the extensive system of the Mississippi Valley Telephone Company, and through it with the important Iowa cities lying beyond.

BEAUMONT AND NORTHWESTERN TELEPHONE COMPANY NOW ON PAYING BASIS.

FROM Beaumont, Texas, comes the news that the Beaumont and Northwestern Telephone Company, which was placed in the hands of a receiver last September on its own application, has been turned back to the owners, the receivership having been dissolved by the court and the receiver, J. W. Mackey, discharged. The company's lines run from Beaumont to Silsbee, Kountze, Kirbyville, Buna, Jasper, Newton, Saratoga and Sour Lake.

The company at no time has been financially involved and under Receiver Mackey the property has been greatly improved, the line to Sour Lake being entirely reconstructed and other

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points bettered until a very satisfactory service has been secured.

The report states that the receiver has administered the property under the direction of the Fifty-eighth District Court, and that there is on hand the sum of $786.36, representing the net earnings of the company during the receivership.

INDEPENDENT FRANCHISE IN MILWAUKEE BEING SOUGHT BY STRONG ORGANIZATION.

SUCCESS is believed to be assured to the Milwaukee Independent telephone company in its attempt to obtain a franchise in the chief city of Wisconsin.

This company includes in its management men who are notably active in Independent development of the most substantial sort. They are already associated with telephone companies which have achieved most excellent results, both from a business and operating standpoint in large enterprises.

That the business interests of the city and the Independent telephone companies already operating in Wisconsin will be well cared for will be evident from an examination of the list of directors and officers, which includes the names of the following well-known men:

Charles J. Chapin, Milwaukee, president of the Flint Mill Co. and a member of the firm of Chapin & Co.

H. D. Critchfield, Milwaukee, of the Consolidated Telephone Co., Buffalo, N. Y.

Howard Greene, Milwaukee, president of the Fidelity Trust Co. and president of Jerman, Pflueger & Kuehmsted Co.

Alvin A. Kletzsch, Milwaukee, secretary of the C. F. Kletzsch Co.

George P. Mayer, Milwaukee, president of the F. Mayer Boot and Shoe Co.

Wilmer Sieg, Milwaukee, of A. Grossenbach & Co., commission merchants.

E. A. Wadhams, Milwaukee, president of the Wisconsin Sugar Co.

J. B. Whitnall, Milwaukee, president of the Pennsylvania Coal and Supply Co.

Clifford Arrick, Indianapolis.

John M. Baer, Appleton, general manager of the Fox River Valley Telephone and Telegraph Co.

W. W. Cargill, La Crosse, president of the W. W. Cargill Co., grain elevators, and vice-president of the La Crosse Independent Telephone Co.

J. C. Harper, Madison, president of the Dane County Telephone Co.

B. G. Hubbell, president of the Consolidated Telephone Co., Buffalo, N. Y.

Richard Valentine, Janesville, president of the Rock County Telephone Co. and president of the Wisconsin Independent Telephone Association.

J. S. Van Nortwick, Appleton, president of the Appleton Paper and Pulp Co. and president of the Fox River Valley Telephone and Telegraph Co.

The directors organized by electing the following officers:

President—H. D. Critchfield.
Vice-president—E. A. Wadhams.
2d Vice-president—J. S. Van Nortwick.
Treasurer—Howard Greene.
Secretary—Clifford Arrick.

Public sentiment has been influenced in favor of the Independent company by the hearty indorsement of the benefits of telephone competition given by prominent members of the Millers' National Federation during the convention recently held at Milwaukee. The improvements in telephone facilities and service which have been brought about through the effective work of the Independent companies and vigorous competition in Kansas City, Cleveland, St. Louis, and many smaller places were described.

If the council grants the franchise, as it is expected to do by a large number of residents in the city, the building of a system which will not only be able to give a satisfactory local service, but will be in a position to give long distance connections to all other important Independent lines, will be commenced at once.

HOME COMPANY WINS OUT AT RICHMOND, IND.

BY the passage of an ordinance substantially the same as proposed by A. C. Lindemuth, president of the Home Telephone Company, the people of Richmond, Indiana, are assured of continued competition of two well constructed telephone systems, with reasonable rates.

Earnest discussion over the propositions of both the Central Union and Home Telephone companies to put their wires underground on the principal streets has been in progress for some time. It is said that the Central Union company proposed an ordinance demanding immediate reconstruction as a measure which would enable it to better meet the competition to which it is exposed, with the object of eventually forcing the Home company out of business. The Home company operates under a franchise imposing limitations upon its rates, while the Bell company's franchise is perpetual, and without limitations.

It was considered by most of the people in the city to be an excellent time to impose rate restrictions upon the Central Union company, in consideration of the granting of the desired permission to put its cables in conduit. This was strenuously resisted, however, by the company's agents, who claimed that the only object of the proposed improvements was to please the people and add to the good appearance of the city's streets. It was further claimed that the company had never submitted to a rate-limiting clause in a franchise and never would do so.

This led the councilmen to make inquiries concerning the terms of the franchise recently granted the Central Union company in Evansville, and produced the following information in a telegram from the mayor of that city:

Bell's new franchise limited to $5 for business, $2.50 residence straight, $3.50 for business, $1.50 for residence for party lines with 10 per cent. increase when 5,500 lines, not 'phones but lines.—J. W. Boehne, Mayor of Evansville.

This seems to have been about all that was needed to throw matters into the condition most favorable to the Independent company. Without discussion the council concurred in the report of its special committee, and passed the ordinance without a dissenting vote. Provisions are made for the regulation of the rates of the Central Union company in the event of reconstruction calling for conduit work as mentioned in the ordinance. Anticipating the reconstruction of the Home Telephone Company's plant, the opportunity was extended by Council for it to increase its rate 25 cents per month on residence telephones and 50 cents per month for business telephones. Other clauses relate to measures designed for the protection of the city.

IMPORTANT CONSOLIDATION OF INDEPENDENT LINES IN NORTH DAKOTA.

(*Continued from page 22.*)

ings, Nichtville and connecting lines. Also the exchanges at Carrington, Fessenden, Bowden and Turtle Lake, with connecting lines to New Rockford and Anamoose.

Exchanges at Bismarck, Dickinson and Glendive and a copper toll line from Bismarck to Glendive. Also connections outside of Dickinson to Fayette and New England and connections from Glen Ullin to Leipzig. Exchanges at Wilton, Washburn, Underwood and Garrison, with connecting lines, and a line from Underwood to Mannhaven, and also a line from Mandan to Center.

In addition to all these a standard copper toll line, connecting Fargo and Grand Forks and Petersburg, with an extension line of the same character to Grafton, which is partly finished.

Other Independent companies are making arrangements to join the North Dakota Independent Company, one of which connections—from Petersburg to Devil's Lake and Starkweather—is already consummated.

Work will be started at once on a heavy copper circuit between Fargo and Bismarck, and when this is completed there will be connections from Fargo to Glendive, Mont., and intermediate points.

The new company will connect at Fargo with the lines of the Tri-State Company, which has an extensive system in Minneapolis and has a comprehensive system of copper toll lines connecting all the larger towns in Minnesota.

One result of this action will be the early expenditure, on the part of the Home company, of about $100,000 to extend its system and put underground a large number of wires at present carried on poles. Thus equipped it will continue to give the high grade service which has brought it the hearty support of its subscribers.

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TELEPHONE PATENTS

SELECTIVE RINGING AND LOCKING DEVICE.

Orris H. Newman, Pekin, Ill., patents (No. 821,820; dated May 29, 1906; filed April 3, 1905; serial number 253,553) selective ringing and locking device.

The method of selecting described in this patent is designed to be controlled by the number of revolutions of the handle of the calling subscriber's generator. An electro-magnetic locking device is provided for, preventing the motion of all receiver hooks of the various telephones on the line other than the one at the station with which conversation is desired. Means are provided whereby after the first ring, which must be made with a given number of revolutions of the generator of the calling telephone, connection is presumably established with the called party, and any number of subsequent rings may be made upon the line without further actuation of the selecting mechanism, for the purpose of repeatedly ringing the bell of the desired person if necessary.

PROTECTOR FOR INSULATORS.

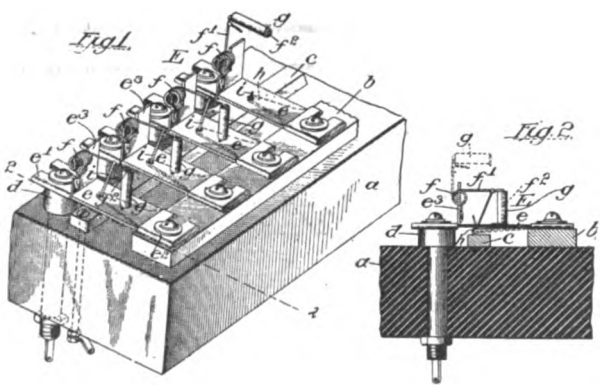
John L. Gleason, Boston, Mass., patents (No. 820,641; dated May 15, 1906; filed February 17, 1904; serial number 194,009) a protector for insulators.

This invention relates to the design of a small box for covering porcelain bushings at points where the wires are led through walls. The patent describes a box made in the preferred form of one-quarter of a section of a cylindrical pipe with flanges closing the end, and suitable openings provided if necessary for the admission of moulding of the usual type used in running electric light wires.

ALARM FUSE.

Edward B. Craft, Chicago, Ill., patents (No. 817,959; dated April 17, 1906; filed February 5, 1904; serial No. 192,183) and assigns to the Western Electric Company, Chicago, Ill., an alarm fuse.

This invention relates to that class of protective devices employed in telephone exchanges to guard the circuits against excessive currents. It has for its object the provision of a form of construction which shall cause the display of an indicator on the rupture of a fuse to facilitate its immediate location by an attendant. Referring to the accompanying illustrations the

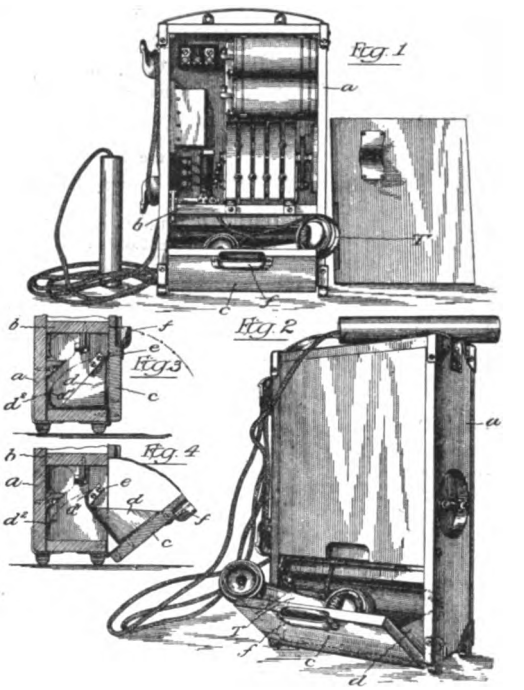


principles of design and operation will be made clear. The slate panel carrying the protective devices is shown at *a* and the common battery bus bar at *b*. The bus bar *c* is connected in series with a signal such as a lamp or bell, which is actuated when a fuse blows. This is known as the "alarm" bus bar. Bolts or studs *d* serve as terminals for the switchboard circuits. The body of the protective device consists of an insulating mounting *c*, carrying terminal plates e^1, e^2. Attached to e^1 is a right angled extension, e^3 which supports a coiled spring having an arm f^1, carrying a target *g*. A tension spring *h* is connected with the terminal e^2 and placed below the strip *e*. The fuse wire connects *h* to f^1 and holds the latter in position. When the fuse is ruptured by an excessive current, the spring f^1 flies upward, displaying the target *g* and the spring *h* closes contact with strip *c*, completing a circuit for the audible signal which attracts the notice of an attendant.

INCLOSING CASE FOR TELEPHONE SETS.

Frank R. McBerty, Evanston, Ill., patents (822,464; dated June 5, 1906; filed December 10, 1904; serial No. 236,400) inclosing case for telephone sets.

The telephone set illustrated in the accompanying drawing is arranged for a portable instrument of the complete magneto



type. The combined transmitter and receiver is designed to be mounted in a pocket, which is so arranged as to eject the telephone from the case, leaving it however supported in an accessible position. A stop *e* provides for limiting the movement of the door through its engagement with the lip d^1 as shown in Fig. 4. When the door is closed the engagement of the lip d^1 with the leaf spring d^2, as shown in Fig. 3, retains it in position.

SWITCH HOOK.

William E. McCormick, Chicago, Ill., patents (No. 820,432; dated May 15, 1906; filed August 26, 1901; serial No. 73,362) and assigns to the International Telephone Mfg. Co., Chicago, Ill., a switch hook.

The object of this invention is to simplify the arrangement of the various parts comprising a device of this character, so that they may be all grouped together in a single structure capable of bodily removal from and replacement in the ordinary telephone box.

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1600 INSTALLED IN ONE STORE IN PHILA. YOU KNOW JOHN KNOWS.

You Can Depend on Grays, As We Don't Have Levers, Springs, Etc.

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WANTED—Cableman. Position permanent. Address Zenith Telephone Company, Duluth, Minn. 644

WANTED—Continued

WANTED—Every wire chief to write for our proposition as a side line. No samples, no time lost from regular work, good pay. Address Jester & Millikan, Marion, Ind. 643.

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FOR SALE—We have on hand at Forth Worth, Texas, a complete 100 line Fisk-Newhall latest type tubular drop express switchboard just out of the factory and never been used. We will sell with all or part of drops installed at a bargain. Address Wesco Supply Co., 7th street and Clark avenue, St. Louis, Mo. 642.

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

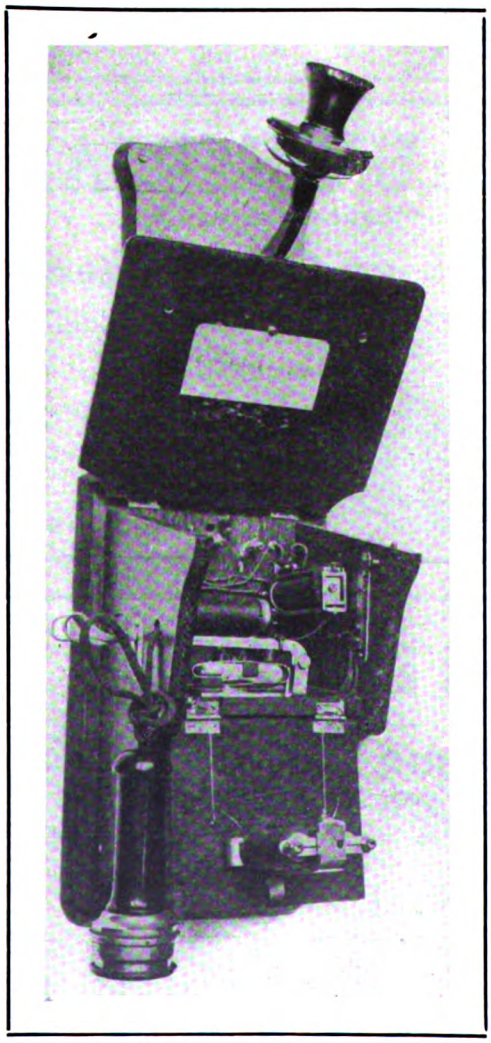
KINKORA—A MODEL CITY.

HOMES carefully designed for securing every comfort in the most clean and attractive surroundings are being built for its employees by the firm of John A. Roebling's Sons in a model city located near the site of the company's new mills, which are being built a few miles from the main plant at Trenton. The old plant covered the entire land owned by the company in Trenton, and when enlargement was necessary a new site had to be bought. Because the prices upon the property adjacent to the Roebling mills in Trenton were prohibitive the location selected was some distance from the city of Trenton.

As it was considered to be impossible for the men to travel from the city to their work each day, and there was no adequate accommodation for so large a number of people in the vicinity of the new location, the company determined to build houses, and furthermore decided to erect a model city. The houses will be of brick, and designed to secure every convenience for comfortable living. The streets will be macadamized, and to the west of the houses and hotels which will be erected is the site of a park, from which may be obtained a view of the river for several miles in either direction. Not only has the company planned for houses and hotels, but other places for social gatherings will be erected.

The company is supervising the planting of shade trees on the streets, and fruit trees in the yards of the homes; the lighting of homes and streets; the supplying of water; and the selling of all supplies. In fact, the entire enterprise will be conducted by the company with the object of obtaining for its employees the best things which may be procured at moderate cost.

The plant at Kinkora will be started in a short time with 1,500 men at work, and the company foresees that within two years this number will be doubled. The success of the city, which is of course dependent only upon the expansion of the Roebling plant which has continued so rapidly in the past, seems assured.

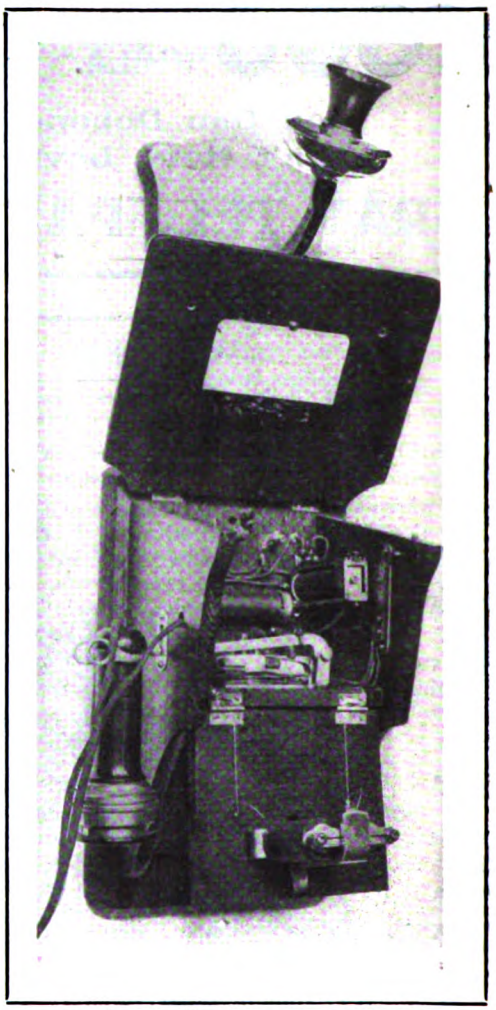


Peru Lockout Telephone; Relay in "Talking Position."

THE SWEDISH AMERICAN TELEPHONE COMPANY, Chicago, Ill., has been and is receiving such a large number of telegraph orders that it has had a direct Western Union wire placed in its office, and an experienced operator has been employed to care for the instruments on this special line.

THE CONNECTICUT TELEPHONE AND ELECTRIC COMPANY, Meriden, Conn., reports unusually large sales of its test telephones, which are said to give very satisfactory service.

THE OKONITE COMPANY, LTD., 253 Broadway, New York, is doing an immense business in its insulated wires, insulating tapes, etc. The high standard established by this company for all its products is a great factor in its success.



Peru Lockout Telephone; Normal Position.

G. M. GEST, the subway contractor of New York and Cincinnati, has closed a contract, through his New York office, for the construction of 500,000 feet of conduit for the Toronto Railway Co. at Toronto. This will finish the subway system for that company and will give it one of the most complete underground conduit systems of any railroad.

THE NORTHERN ELECTRICAL COMPANY, dealer in electrical supplies and machinery, has recently removed its headquarters from Duluth to No. 9 South Fifth street, Minneapolis. It will, however, maintain its present offices at 18-20 Third avenue West, Duluth, Minn., as a branch.

A CENTRAL ENERGY LOCK-OUT SYSTEM.

REQUIRING no additional central office equipment, free from effect on the efficiency of the talking circuit, completely enclosed in the instrument cabinet and easily applied to instruments already in use is said to be the new lock-out system of the Peru Common Battery Lockout Telephone Company, of Peru, Ind. A high wound relay does the work, and no impedance is necessary either in series with or bridging any part of the talking circuit.

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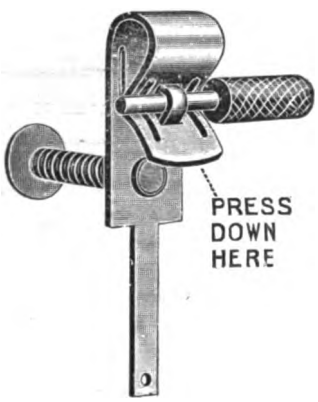
A NECESSITY



On distributing frames, dry batteries, and wherever permanent or temporary electrical connections are made

THE NO. 11

Fahnestock Spring Binding Post

was made to the special order of a large telephone company. It has an extra long lug and is well suited for use on distributing boards and other places about an exchange. Manufacturers of the leading dry batteries will supply their cells fitted with Fahnestock post without extra charge.

We carry a number of different styles in stock. Write for our new booklet.

Special designs made to order.

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The Rule of Thumb

is not a good rule in mechanism

The distance from first joint to end of thumb nail is not a reliable standard of measurement. It is liable to be different in every thumb; therefore the best mechanicians employ a more accurate tool for measuring inches, one which insures uniform and accurate results.

Why should the revenue from **Telephone Toll Lines** continue to be determined by "rule of thumb?" by allowing the operators to "estimate" or "guess" how long a conversation has continued? Some operators may be better guessers than others. Their estimates of the duration of a period of three minutes is certain to vary.

A better rule is the **Calculagraph** rule.

It makes no errors. Its record is accurate. It is never in doubt and upon its records all excess minutes are paid for without question. Better let us tell you more about it.

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IN THE OPERATING FIELD

Referring to the drawing the operation is as follows:

B is the central office battery, grounded at G. I-I represents impedance, in the form of a relay, repeating coil or retardation coil, supplying current to the line wires L-L'.

Suppose a voltmeter be attached from line L to ground, the reading would, of course, be the voltage of battery B. Now with all receivers on their hooks, change the voltmeter to line wire L-L"'. There being no source of potential between the ground G and the voltmeter, the reading is zero.

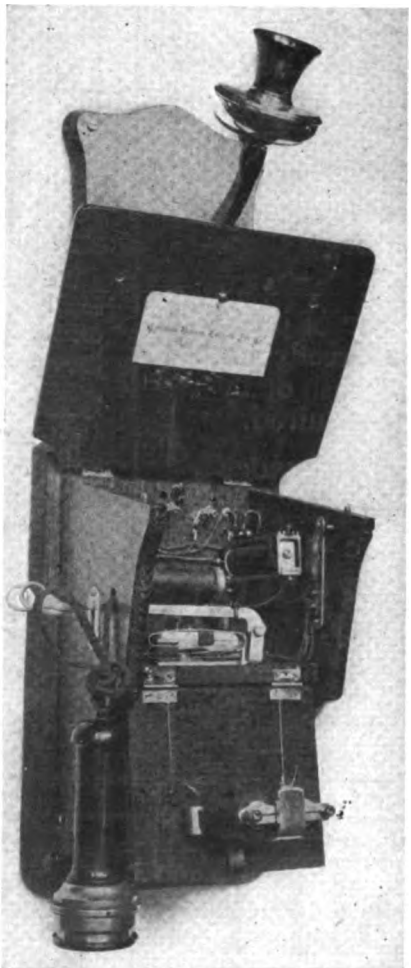
Leaving the voltmeter in this position, lift the receiver from a telephone on the line, thus, connecting line L carrying the battery voltage with line L'-L"' which previously carried no voltage, we have the voltmeter reading, approaching the battery voltage. This change in voltage is taken advantage of to operate the locking magnets R & R' of the telephones M & N.

On removing receiver from hook of station M the circuit is established from line wire L to post 3, thence over wire 4 through the induction coil and transmitter to contact C (which is closed by the releasing of the armature of relay by spring F, attached to hook H) wire 5, normally closed contact K, contact S, wire 6, post 1 to wire L', a portion of the current taking wire L"' to post 1', wire 7, winding R', wire 8'-post 2' to ground G", thus energizing relay R'.

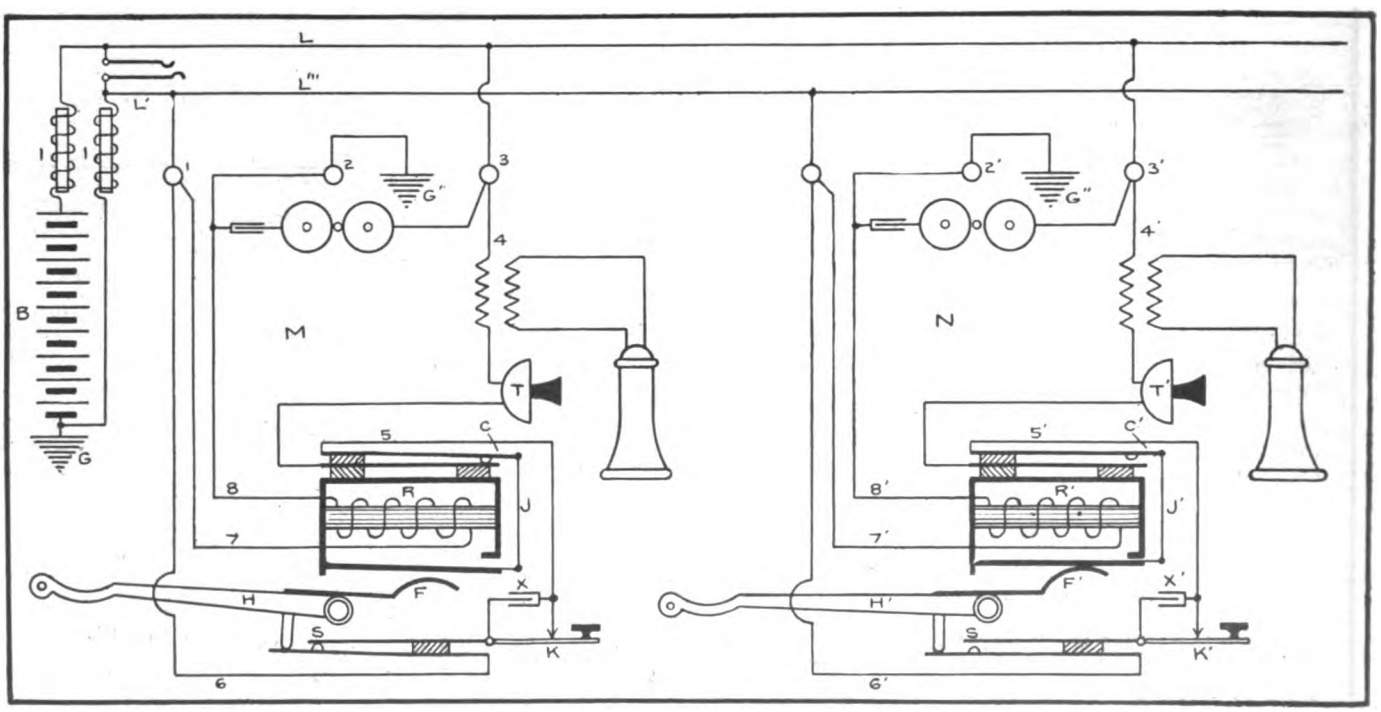
Now, should an attempt be made to use station N, the hook H will rise, the spring F will disengage the armature, but the armature remains in the closed position, and through the insulated rod J holds contact C open, which of course makes station M inoperative. Should station M wish to call any other station N, he gives the operator the number in the usual way; the operator instructs him to "press button until party answers," opening contact K bridged by condenser X, thus cutting all current off line wire L'L"', and de-energizing relay R'. The operator rings station N, and upon answering is heard by the party at station M, through condenser X. Station M now releases the push button, closing contact K, thus completing a talking circuit between the two stations. Should station N not answer on the first call, the operator will continue to ring, she having complete supervision. The supervisory lamp lights when contact K is open, remaining lighted until the called party answers.

The relay being wound with as large wire as possible on a heavy core to a resistance of 1,600 ohms, and having a completely closed magnetic circuit, the impedance is very high, offering practically no path to the voice currents which should follow strictly the metallic circuit.

No amount of jarring will release a locked instrument and no safety device is needed to prevent such release, nor to insude that it remains in its proper position. The manufacturers will give complete information to those who desire it.



Peru Lockout Telephone; Relay in "Busy position."



Circuits of Common Battery Lockout System. The Peru Common Battery Lockout Telephone Company.

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Standard Telephone Apparatus

THE DEVEAU PATENTED AUTOMATIC SWITCHLESS TELEPHONES are the result of many years experience in the manufacture of telephone apparatus. The new BALL BEARING feature makes them free from the ordinary troubles common to this type of apparatus of other manufacture. They are guaranteed to be mechanically and electrically perfect.

The new desk set has a capacity from 2 to 32 stations and the wall set from 2 to 50 stations. The apparatus is neat, compact and thoroughly reliable in every respect.

Our large and well equipped plant is placed at the disposal of our trade and at any time special apparatus is desired, other than our standard line, we are only too pleased to do all we can to meet the requirements that special cases may demand.

DeVeau Apparatus is used in Government work generally; for hotels, apartment houses, schools, private residences, etc.

Send for our 12th edition catalogue, containing a full line of DeVeau Telephone Apparatus, Switchboards and Materials together with a line of wiring diagrams for every purpose.

ORIGINATORS OF AUTOMATIC DE VEAU SWITCHLESS TELEPHONES

Full information and wiring diagrams will be furnished on request.

AGENTS IN ALL PRINCIPAL CITIES.

TELEPHONE MFG. CO.

NEW YORK, U. S. A.

You remember that the poet says:

"Thus times do shift; each thing his turn doth hold;
New things succeed as former things grow old."

It is true everywhere—you want the new and better—you like originality, initiative, ideas.

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NEW COMPANIES.

JASPER, ALA.—Articles of incorporation are to be filed by the Home Telephone Company of Walker County, an Independent telephone company. It will build lines in five or six counties, and has a capital of $5,000. The officers of the company are E. M. Cranford, president; J. N. Odom and William Guaganus, vice presidents; J. A. Coleman, secretary and treasurer. The company will establish exchanges at Jasper and Oakman, the headquarters are to be at Jasper.

OROFINO, IDAHO.—The Farmers' Mutual Telephone Company has been organized by Fred Deiterle, Andrew Smith and F. W. Powell. The company will build a line from Orofino to Peck and from that point to Gilbert.

NEW ATHENS, ILL.—The New Athens & Hecker Telephone Company has been incorporated with a capital stock of $600. The incorporators are J. A. Barthel, Henry Schaeffer and Fred Schanz.

QUINCY, ILL.—Articles of incorporation have been filed by the County Home Telephone Company, Quincy. The incorporators of the company are F. S. Elliott, E. Best and James F. Burnett. The capital stock is placed at $2,500.

WAWPECONG, IND.—The Cedar Line Telephone Company, with a capital stock of $1,000, has been organized. Among the incorporators are Walter Shively, Isaac L. Meyers and Samuel Myers.

SKIATOOK, I. T.—An Independent Telephone Company, under the management of T. F. McVay, has been formed at Skiatook. The company is installing an exchange at that city, and will build lines into the surrounding country.

REMSEN, IA.—A new telephone company has been formed by the farmers living east and southeast of Remsen. The construction of the company's lines will be undertaken at once. Among the organizers are Albert Mensen, Charles Rosberg, B. Huew, Jacob Pick, Detlef Lindeman and John Schneider.

ALEXANDRIA, LA.—An Independent telephone company is being organized at Alexandria by the citizens of that city. The capital stock will be fixed at $50,000, and an application for a franchise will be made at the next meeting of the Board of Aldermen of Alexandria. This company will operate in opposition to the Cumberland Company, whose service is said to have been far from satisfactory.

LOVELL, ME.—The farmers of Sweden have formed a stock company to be called the Sweden Telephone Company. It is proposed to build a line from Waterford to Lovell, with an exchange at Lovell. The following officers have been elected: President, C. E. Jones; treasurer, Alvin Pike; directors, Daniel Holden, Edward Stone, Harry Bisbee and C. W. Bennett.

KALAMAZOO, MICH.—The Citizens Telephone Company has been incorporated with a capital stock of $250,000. The company will install an Independent telephone system at Kalamazoo to cost between $300,000 and $400,000. Among the incorporators is E. W. Bowman, a Kalamazoo financier.

HOLDEN, MO.—The Citizens Telephone Company at Holden has been organized with M. C. Bell as president, and J. H. Zehr as secretary and treasurer.

LOGAN, NEB.—The Logan Telephone Company has filed articles of incorporation. It will operate a mutual telephone exchange, and has a capital of $680.

WELLFLEET, NEB.—The Wellfleet Telephone Company, of Wellfleet, has filed articles of incorporation. It expects to build lines in Lincoln, Frontier and Hayes counties. Capital stock to the amount of $4,800 will be issued. The incorporators are W. N. Parcel, A. C. Burton, T. L. Baker, J. C. Hamilton, G. E. McMullen, Geo. Cooper, Daniel Wakefield, W. V. Votaw and J. H. Knowles.

BERKSHIRE, N. Y.—The Home Telephone Company has been organized and will build lines to Richford, Speedsville and Rawson Hollow. The officers of the new corporation are: President, A. E. Smith; vice president, C. D. Phillip; secretary, J. W. Benton; treasurer, H. Thuillard.

DEPOSIT, N. Y.—An Independent telephone company has been incorporated at Deposit, N. Y., with the following directors: B. E. Radeker, A. Seymour Wickwire, L. D. Howell, F. D. Wilcox, C. P. Smith and Dee C. Freeman, of Deposit; E. A. Bronson, of Sherman, Pa.; D. B. Seymour, of Cannonsville; W. J. Garvey, of Elmira; S. C. Ormsbee, of Syracuse; W. C. Sexsmith, of Binghamton. The company will have an authorized capital stock of $12,000.

BEACH CITY, O.—The Beach City Home Telephone Company, with a capital stock of $2,500, has been incorporated by A. B. Wingate, Jacob Musand, O. E. Eberlin, J. M. Ramsey, M. W. Briggs and J. T. Hay. The company will build a line between Strasburg and Beach City.

BLUE CREEK, O.—The Blue Creek Telephone Company has been incorporated with a capital stock of $3,000. The incorporators are R. C. Jones, G. B. Hile, F. E. Morrison, O. E. McHenry and Albert Jones.

CHESTERHILL, O.—The Amisville Telephone Company, Chesterhill, has been incorporated with a capital stock of $25,000 by A. E. Swayne and others.

IRONTON, O.—Articles of incorporation have been filed by the Home Telephone Company of Ironton. The capital stock is $50,000, and the incorporators are R. A. Knapp, E. W. Bixby, S. P. Humphrey, B. F. Forgy and J. C. Snyder.

LONDONDERRY, O.—A Farmers Telephone Company has been formed by J. W. Morton, Alonzo Rankin, Samuel Suddeth and B. K. Tedrick.

WILLSHIRE, O.—The Looking Glass Telephone Company has been organized. The officers of the company are: A. C. Vernon, president; S. B. Cockrell, vice president; William Voorhies, secretary; W. E. Miller, treasurer.

GUTHRIE, OKLA.—The Mutual Construction & Extension Company has been incorporated with a capital stock of $3,000,000, and will erect telephone exchanges in Oklahoma, Indian Territory, Kansas and the Southwest.

CATAWISSA, PA.—The Farmers Mutual Telephone Company has been organized in Catawissa township with the following officers: W. T. Creasy, president; N. C. Hartman, secretary; F. P. Creasy, treasurer.

LETCHER, S. D.—The Farmers Co-operative Telephone Company has been formed at Letcher. The company has installed a switchboard at that city, and is preparing to build lines to neighboring towns.

GRANGER, WASH.—The Farmers Mutual Telephone Company has been organized, and will commence the construction of its lines at once.

GREEN BOTTOM, W. VA.—The Green Bottom Telephone Company has been organized and will build a line to Huntington.

DODGEVILLE, WIS.—The New Union Telephone Company, with a capital stock of $50,000, has been incorporated. The incorporators are Orville Strong, J. P. Smelker and D. H. Williams.

LOYAL, WIS.—The Farmers Telephone Company has been organized at Loyal, Wis., with the following officers: President and manager, C. M. Taylor; secretary, M. M. Weaver; treasurer, H. Haslett; directors, H. Kilburn and J. M. Philpott.

MARATHON, WIS.—Articles of incorporation have been filed by the Marathon City Telephone Company. The incorporators are Nicholas Schmidt, J. G. Lang, Adam Mucha and A. Akey. The stock of the company is placed at $1,970.

FRANCHISES.

MARYSVILLE, CAL.—F. W. Anderson, of Wheatland, who has already made connections with Lincoln, Nicolaus and Auburn, has applied for a franchise to bring his lines into Marysville.

WHEATLAND, CAL.—The Wheatland Telephone Company is endeavoring to secure a franchise at Marysville.

DAYTON, O.—The Home Telephone Company of Dayton has been granted a franchise to construct a telephone system in Osborn.

LOGAN, O.—The Logan Home Telephone Company has secured a franchise to operate in the village of Straitsville, and will extend its lines to that point and establish an exchange there. The company is extending

NEWS—WANTED

THE matter contained upon the Message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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Built on "Quality Not Price"

PAT. APRIL 25, 1905

Simple. ☞
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Sumter Standard Parts. ☞
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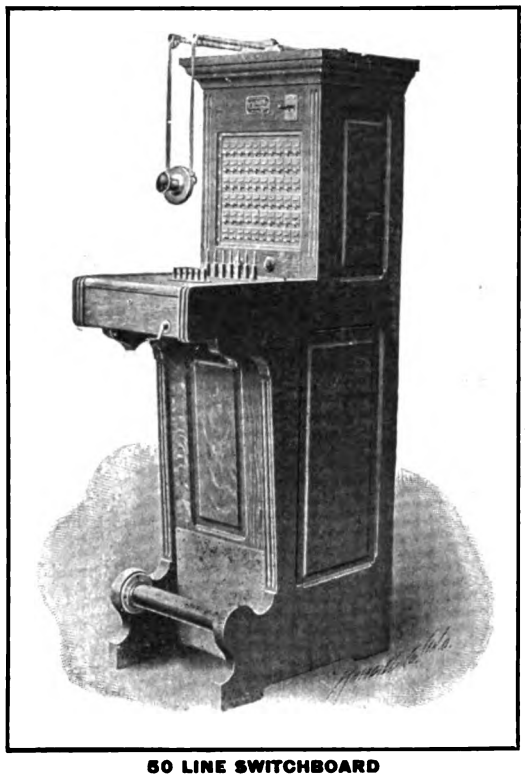
You Will Want One When You Fully *Investigate* and *Compare* with Others.



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The Sumter Telephone Mfg. Co.
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We Manufacture

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SECURE OUR PRICES

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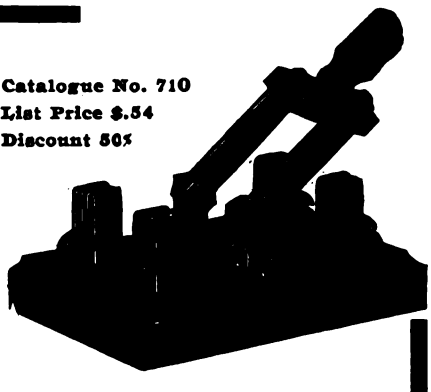

It Pays

To equip your system with good switches. One poor contact and a line is in trouble—a subscriber disgusted. All the work you have done to make your system reliable is as good as wasted.

You must have switches in your exchange.

The Trumbull Switch

Is absolutely reliable for it is carefully made and has the "U" clip that takes up all wear and allows for imperfect porcelain.

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Write for new catalogue.

Trumbull Electric Mfg. Co.
618 Woodford Ave., Plainville, Conn.

Please mention THE AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

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THE WEEK'S MESSAGES

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McCLELLAND, IOWA.—The Independent Telephone Company, of Council Bluffs, is installing an exchange at McClelland.

SLOAN, IA.—The Lossing Telephone Company will build lines into the Albaton neighborhood and south of Sloan.

COUNCIL GROVE, KAS.—The Council Grove Mutual Telephone Company, which has completed its organization, is to commence the construction of its system, which will give service to Council Grove and the surrounding towns.

WILLIS, KAS.—The North East Telephone Company, of Horton, is to establish connections with Willis.

BENTON HARBOR, MICH.—The Twin City Telephone Company is rebuilding its system at Benton Harbor.

LITCHFIELD, MICH.—The Independent Telephone Company expects to build a toll line to Hillsdale, also one from Mosherville to Hanover.

PONTIAC, MICH.—The Oakland Telephone Company expects to make many improvements in its system at Pontiac.

GLENVILLE, MINN.—The Tri-State Telephone Company of Minneapolis will construct a line to Glenville.

GRAND RAPIDS, MINN.—The Mesaba Telephone Company, of Mesaba, Minn., contemplates installing an exchange at Grand Rapids, Minn.

HALLOCK, MINN.—The Kitson Telephone Company, with headquarters at Hallock, Minn., is extending its lines.

STAPLES, MINN.—The Staples telephone exchange is to be rebuilt along modern lines and greatly improved and enlarged.

HARRISON, NEB.—J. A. Anderson and W. F. Shepherd are constructing a telephone line to Warbonnet.

PLATTSMOUTH, NEB.—The Plattsmouth Telephone Company is to construct several lines to Magic City.

CLINTON, N. Y.—Many improvements in its system are planned by the Home Telephone Company of Clinton.

NEW WOODSTOCK, N. Y.—The lines of the Cummings-Stoddard Telephone Company are to be extended to Erieville.

LANGDON, N. D.—The construction of telephone lines from Langdon to Nekoma by the Langdon Telephone Company is soon to be commenced.

MAGNOLIA, O.—A franchise having been granted to the Sandy Valley Telephone and Electric Company by the Waynesburg village council, the company will commence the construction of lines connecting Magnola, Sparta, Waynesburg and Malvern.

PORTSMOUTH, O.—The Portsmouth Telephone Company's improvements in its system it is estimated will cost in the neighborhood of $80,000.

UNIONDALE, PA.—The North East Penn. Telephone Company is extending and improving its system.

LEOLA, S. D.—The lines of the Western Mutual Telephone Company will be extended to Aberdeen.

STANLEY, N. B.—The Stanley Telephone Company contemplates the expenditure of a large sum of money in improving its system.

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Single copies, 10 cents. Subscription price, $1.00 a year. Foreign countries, $3.00 a year.

The American Telephone Journal

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VOLUME XIV *SATURDAY, JULY 21, 1906* *NUMBER 3*

The Present Telephone Situation in the City of Chicago

Owing to the great importance attached to the obtaining of connections with Chicago by subscribers to the Independent systems of the Middle West the sentiment of the people of that city in the present complex condition of telephone affairs is especially interesting.

Realizing the desire for information which is felt by telephone men in all parts of the country, THE AMERICAN TELEPHONE JOURNAL has secured, and presents herewith, statements from the three men who have led in the movement for a better service.

MAYOR DUNNE'S OPINION.

"The situation has not developed yet, and I am not willing to go upon record in favor of one company or the other. You may say, however, that I am opposed to closing the doors of Chicago to any Independent company which desires to make connection with us.

"I shall be in favor of the company which will give us the best local service. At the same time I believe that company should be compelled to connect with the Independent companies which are trying to get into the city."

THE STATEMENT OF THE CORPORATION COUNSEL.

James Hamilton Lewis, Corporation Counsel for the City of Chicago.

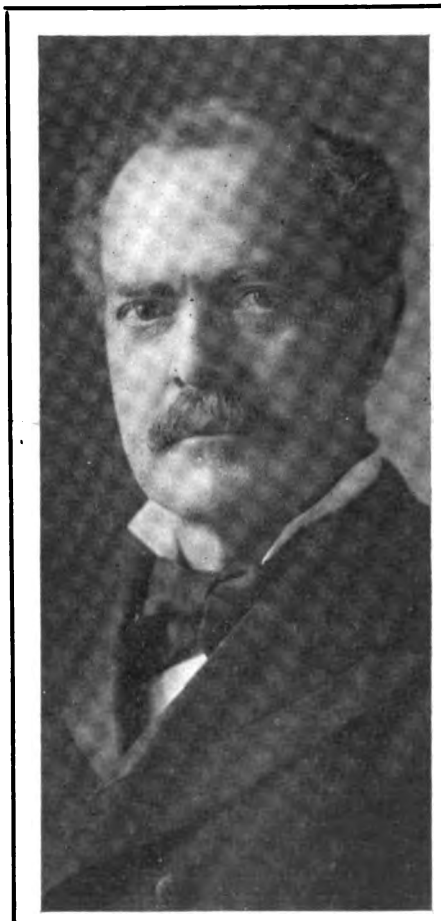
JAMES HAMILTON LEWIS, corporation counsel of the city of Chicago, has carried on extensive and valuable investigations of the charges for service made by the present company. He has not merely acquired knowledge of the subject—he has used it. The present situation, resulting from the action brought against the telephone company to compel the fulfillment of certain obligations in regard to rates, he describes as follows:

"The Chicago Telephone Company is authorized to do business in the city of Chicago by an ordinance passed by the City Council on January 4, 1889, the rights granted being for a term of twenty years. The ordinance provides that the rates then established for telephone service should not be exceeded during the term of the grant. The rates then established were $125.00, annually, for telephones devoted to the business use of the subscriber and his employes; $150.00 for telephones devoted to the use of the subscriber and his employes, with the right to permit the use of the telephone by the public at a charge per message of ten cents, to be paid by the user to the subscriber. Subscribers for residence telephones were to pay $100.00 annually.

"These rates were established within a certain district of the city of Chicago as it then existed, which appeared on a map of the city bounded by blue lines, and this district has been familiarly known as the 'blue line' district. Outside of the 'blue line' district the company was then in the habit of charging $25.00 a year additional for each mile beyond the district.

"About the year 1893 or 1894, the Chicago Telephone Company began the substitution of the metallic circuit for the grounded circuit telephone service.

"For a number of years prior to 1903 the company had made a practice of charging $50.00 additional for metallic circuit telephone service to business subscribers, claiming the charge was authorized by reason of the improved service, which was capable of use in connection with long distance lines.



Edward H. Dunne, Mayor of Chicago.

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McCLELLAND, IOWA.—The Independent Telephone Company, of Council Bluffs, is installing an exchange at McClelland.

SLOAN, IA.—The Lossing Telephone Company will build lines into the Albaton neighborhood and south of Sloan.

COUNCIL GROVE, KAS.—The Council Grove Mutual Telephone Company, which has completed its organization, is to commence the construction of its system, which will give service to Council Grove and the surrounding towns.

WILLIS, KAS.—The North East Telephone Company, of Horton, is to establish connections with Willis.

BENTON HARBOR, MICH.—The Twin City Telephone Company is rebuilding its system at Benton Harbor.

LITCHFIELD, MICH.—The Independent Telephone Company expects to build a toll line to Hillsdale, also one from Mosherville to Hanover.

PONTIAC, MICH.—The Oakland Telephone Company expects to make many improvements in its system at Pontiac.

GLENVILLE, MINN.—The Tri-State Telephone Company of Minneapolis will construct a line to Glenville.

GRAND RAPIDS, MINN.—The Mesaba Telephone Company, of Mesaba, Minn., contemplates installing an exchange at Grand Rapids, Minn.

HALLOCK, MINN.—The Kitson Telephone Company, with headquarters at Hallock, Minn., is extending its lines.

STAPLES, MINN.—The Staples telephone exchange is to be rebuilt along modern lines and greatly improved and enlarged.

HARRISON, NEB.—J. A. Anderson and W. F. Shepherd are constructing a telephone line to Warbonnet.

PLATTSMOUTH, NEB.—The Plattsmouth Telephone Company is to construct several lines to Magic City.

CLINTON, N. Y.—Many improvements in its system are planned by the Home Telephone Company of Clinton.

NEW WOODSTOCK, N. Y.—The lines of the Cummings-Stoddard Telephone Company are to be extended to Erieville.

LANGDON, N. D.—The construction of telephone lines from Langdon to Nekoma by the Langdon Telephone Company is soon to be commenced.

MAGNOLIA, O.—A franchise having been granted to the Sandy Valley Telephone and Electric Company by the Waynesburg village council, the company will commence the construction of lines connecting Magnola, Sparta, Waynesburg and Malvern.

PORTSMOUTH, O.—The Portsmouth Telephone Company's improvements in its system it is estimated will cost in the neighborhood of $80,000.

UNIONDALE, PA.—The North East Penn. Telephone Company is extending and improving its system.

LEOLA, S. D.—The lines of the Western Mutual Telephone Company will be extended to Aberdeen.

STANLEY, N. B.—The Stanley Telephone Company contemplates the expenditure of a large sum of money in improving its system.

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VOLUME XIV *SATURDAY, JULY 21, 1906* *NUMBER 3*

The Present Telephone Situation in the City of Chicago

Owing to the great importance attached to the obtaining of connections with Chicago by subscribers to the Independent systems of the Middle West the sentiment of the people of that city in the present complex condition of telephone affairs is especially interesting.

Realizing the desire for information which is felt by telephone men in all parts of the country, THE AMERICAN TELEPHONE JOURNAL has secured, and presents herewith, statements from the three men who have led in the movement for a better service.

MAYOR DUNNE'S OPINION.

"The situation has not developed yet, and I am not willing to go upon record in favor of one company or the other. You may say, however, that I am opposed to closing the doors of Chicago to any Independent company which desires to make connection with us.

"I shall be in favor of the company which will give us the best local service. At the same time I believe that company should be compelled to connect with the Independent companies which are trying to get into the city."

THE STATEMENT OF THE CORPORATION COUNSEL.

James Hamilton Lewis, Corporation Counsel for the City of Chicago.

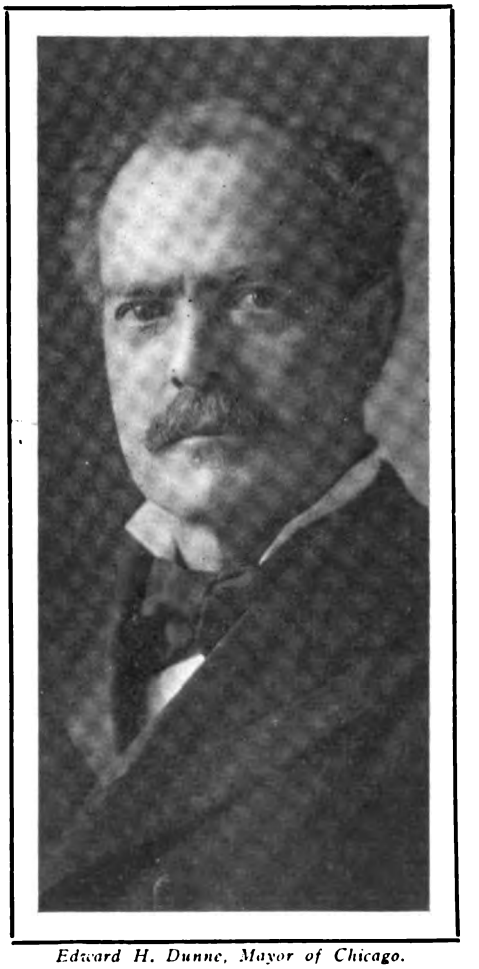
JAMES HAMILTON LEWIS, corporation counsel of the city of Chicago, has carried on extensive and valuable investigations of the charges for service made by the present company. He has not merely acquired knowledge of the subject—he has used it. The present situation, resulting from the action brought against the telephone company to compel the fulfillment of certain obligations in regard to rates, he describes as follows:

"The Chicago Telephone Company is authorized to do business in the city of Chicago by an ordinance passed by the City Council on January 4, 1889, the rights granted being for a term of twenty years. The ordinance provides that the rates then established for telephone service should not be exceeded during the term of the grant. The rates then established were $125.00, annually, for telephones devoted to the business use of the subscriber and his employes; $150.00 for telephones devoted to the use of the subscriber and his employes, with the right to permit the use of the telephone by the public at a charge per message of ten cents, to be paid by the user to the subscriber. Subscribers for residence telephones were to pay $100.00 annually.

"These rates were established within a certain district of the city of Chicago as it then existed, which appeared on a map of the city bounded by blue lines, and this district has been familiarly known as the 'blue line' district. Outside of the 'blue line' district the company was then in the habit of charging $25.00 a year additional for each mile beyond the district.

"About the year 1893 or 1894, the Chicago Telephone Company began the substitution of the metallic circuit for the grounded circuit telephone service.

"For a number of years prior to 1903 the company had made a practice of charging $50.00 additional for metallic circuit telephone service to business subscribers, claiming the charge was authorized by reason of the improved service, which was capable of use in connection with long distance lines.



Edward H. Dunne, Mayor of Chicago.

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"In 1905 quo warranto proceedings were brought by the State's attorney, at the instance of the city of Chicago, against the telephone company, requesting a forfeiture of the company's charter and of the city ordinance above referred to, upon the ground that the company had been engaged in charging illegal telephone rates and had been guilty of illegal and arbitrary discrimination. The telephone company filed a plea to the information, to which a demurrer was filed and overruled by the Circuit Court, which ordered the information dismissed. An appeal was prosecuted to the Supreme Court of Illinois, which reversed and remanded the judgment of the Circuit Court, with directions to sustain the demurrer of the plea, and holding that the telephone company under its ordinance could not exceed the maximum rates established by the ordinance either for metallic circuit or grounded circuit telephone service. The city contends that the result of this decision is that the Circuit Court must enter a judgment of forfeiture against the company, so far as the ordinance of 1889 is concerned. The result of the decision has been a discontinuance on the part of the company of its annual charge of $175.00 for metallic circuit telephone service and a discontinuance of the practice of charging tolls to subscribers who pay the maximum rates for any message which was originated and terminated within the city limits.

"The Chicago Telephone Company is now negotiating with the City Council for a new ordinance with a new schedule of rates. These negotiations are still only in a preliminary stage."

Interview with J. M. Glenn, Secretary of the Illinois Manufacturers' Association

THE movement against the telephone company in Chicago has resulted from both the inefficiency of the service and the extortion practised in the rates. By the ordinance of 1889 the Chicago Telephone Company, operating in the northern counties of Illinois, was authorized to make a maximum charge of $125 a year in a certain irregular shaped district. Outside of this district the authorized charge was $25 a mile in addition. Under this arrangement one telephone was known to cost as high as $450 a year.

This was "going some" but not good enough for an able bodied Bell company, obliged to help support the parent company as well as take care of its own stockholders. All that was needed was an excuse for boosting the price. This was forthcoming a few years later when the company installed a copper metallic circuit. When the ordinance was passed wall telephones and the ordinary grounded circuit were in use. On the theory that the cost of operating with a metallic circuit was greater, the company raised its rate to $175 a year for long distance service.

An additional toll charge was made for long distance connections. Outside the district referred to the company started with a charge of $175 as a basis and continued to add $25 a mile as before.

This was not good enough for the Bell company. The advent of private switchboards and other "frills" gave an opportunity to make new charges.

If you want a switchboard, they charge you for the switchboard; they charge $365 for the main wire; three cents per message for the other wires and $12 for each extension. In some cases the charge is $125 for trunk lines and $100 for each extension. It is all the same. They make it up one way or another.

On the three cents a message wires the company "plays both ends against the middle" very successfully and manages in some way to get three cents for every message it sends.

When the new plan was adopted of charging $365 and tolls, the members of the Illinois Manufacturers' Association began to "sit up and take notice." We began one action to keep them from charging $175 and another to recover what had been paid in excess.

The company had been charging toll in addition to the maximum rate, ten cents to South Chicago, etc. The court held that the maximum rate, $125, should include toll.

The effort to secure an Independent franchise in the city was an after-thought. A few months ago the Manufacturers' Telephone Association was organized by the directors and stockholders of the Illinois Manufacturers' Association, and a telephone franchise in the city of Chicago will be sought.

Meanwhile the Bell company has made a new proposition to the Council on the basis of a measured service. Some of the members of the Manufacturers' Association, after a careful computation based upon past experience, declare this plan will cost more than the other.

They modified their figures after we began to talk, then we told the Council committee that we would make the rate thirty per cent cheaper.

The Council says it will not grant two competing franchises. Councils have been known to change their minds, but if this decision is adhered to and the Manufacturers' Telephone Company gets its franchise the Bell company will be forced out of the city. Its franchise expires in January, 1909. The new company estimates it will take until that time to install its proposed plant, which will cost in the neighborhood of $10,000,000.

We are going after that franchise. We are anxious to cooperate with the Independents. They ought to be in this town and we will get them in.

The new company is organized as a strictly commercial proposition. The backers are all business men. They are not doing this for glory. You couldn't get these firms to put $100,000 into a business just for the sake of licking the other company. They expect adequate returns on their investment.

The Illinois Manufacturers' Association represents an immense capitalization. It has one thousand members and includes such well known Chicago concerns as the Illinois Steel Company, Armour & Company, Swift & Company, International Harvester Company, The Fair, Sears, Roebuck & Company and Montgomery Ward & Company.

METHOD OF MAKING GROUND CONNECTIONS.

By G. A. Barnes.

IN the exchange of the Hamilton Telephone Company, Hamilton, Mo., for ground connections a steel rod 5 ft. long and 3⅛ inches in diameter is used. The preferable form is a pump rod or old fashioned rake tooth. One end of the rod is a little larger than the main part with a notch to hold the wire when it is being driven down. An iron handle about 18 inches long is provided with a hole large enough to slip over the rod, and after it is in place a head is firmly fixed on the shaft above it. As the point and head are a little larger than the main shaft the handle cannot be slipped off the rod.

To make a ground the rod is hammered down first without the wire being attached, in order to make sure that rocks are not in the way, as their presence would be likely to cause the wire to be cut off at a point where it is attached to the rod when driven down. After making this test the wire is attached to the notch in the rod and driven into the ground. The handle is useful in pulling out the rod when it has been driven to nearly its full length into hard ground. When the wire has been attached a wooden mallet should be used for driving. It has been found that the use of a sledge gives too sudden a blow, and frequently causes the wire to be cut before the rod has been diven to a sufficient depth. The use of No. 12 or 10 copper wire is recommended, as this makes one piece of wire from the ground to the place where the insulated wire leaves the telephone. This may be stapled to any convenient object. Its use furnishes a means of doing away with open grounds frequently due to rusting and corrosion of iron wires.

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Harmonic Party Line Systems*

By W. W. Dean.

WHILE the motor generator ringing machines previously described serve their purpose, they necessarily limit the use of the harmonic system of ringing to such exchanges as can obtain the necessary electric current for their operation. These machines are furthermore expensive in first cost, also in

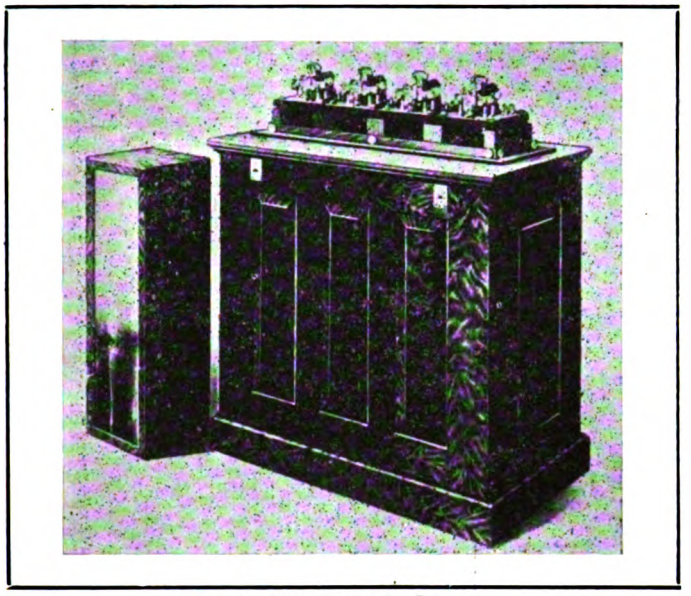

Fig. 11. The Harmonic Converter.

operation and maintenance, when compared to the cost of a telephone switchboard and the cost of current required to operate it. Thus many small exchanges have been prevented from installing the harmonic system, and a big demand created for a simple and inexpensive method of producing the harmonic currents without the necessity of special power circuits, and without a big current consumption. The harmonic converter shown in Fig. 11 is a result of this demand. It is made up of four separate units, each consisting of a pole changing vibrator, a transformer adapted to the frequency of its associated vibrator

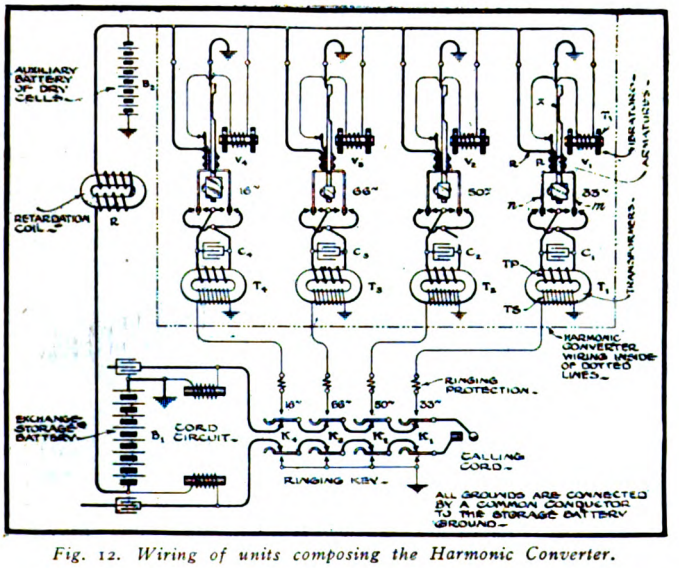

Fig. 12. Wiring of units composing the Harmonic Converter.

and designed to give the proper voltage in its secondary winding for the operation of the harmonic ringers previously described, and a condenser also suitably proportioned to the electrical conditions of the circuits. These units are shown with their connecting wiring in Fig. 12. It will be seen that the vibrators V-1, V-2, V-3 and V-4 have electromagnets *T* operating armatures *P* similar to the action of an ordinary electric house bell. Upon these armatures are mounted two springs, *m* and *n*, which are connected to the terminals of a source of direct current supply. Four contacts are arranged, two on either side of the springs, so that when the armature is drawn up the current will be allowed to flow through the primary winding *T P* of the trans-

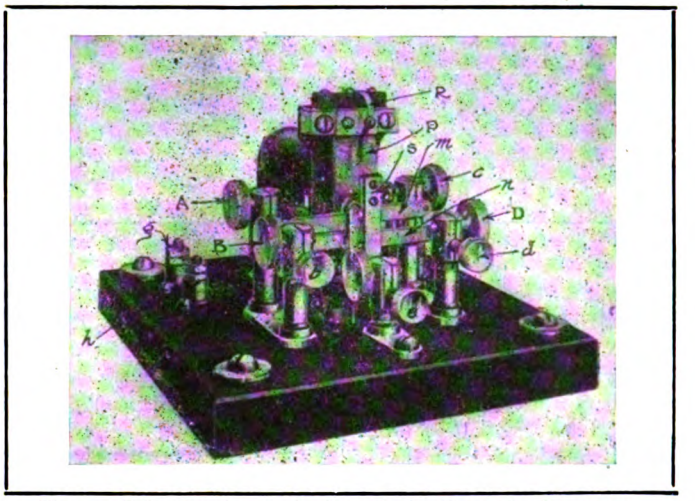

Fig. 13. Pole changing mechanism of the Harmonic Converter.

former, and when the armature swings back, these latter contacts are cleared and the other two contacts are made, causing current to flow in opposite direction through the same primary winding. The condenser *C*, which is placed across the primary winding of the transformer, takes up the discharges from the coil and prevents sparking at the vibrator contacts. It also assists in rendering the alternating effect in the primary winding more uniform and efficient. One of the secondary terminals on each of the transformers is connected to a common conductor, and, together with conductors from the other four free terminals,

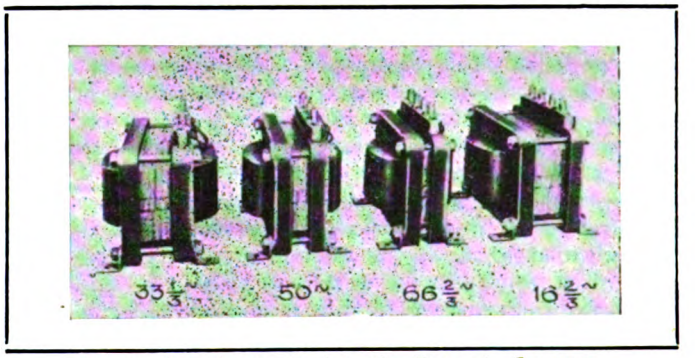

Fig. 14. Transformers used in the Harmonic Converter.

serve to carry the four frequency ringing currents to the switchboard.

Unlike the direct connected motor driven multi-frequency generator, the separate units of the harmonic converter allow the use of the most desirable frequencies for non-interference in ringing. Thus in the harmonic converters exhibited eight different frequencies are generated, each tuned so as to operate its proper bell without causing any of the remaining seven bells bridged across the same line to ring. This eight party selective system, without the use of grounds or third wire connection, is only one possibility of the harmonic converter, and represents

Editor's Note: This paper was presented at the meeting of the Pittsburg section of the American Institute of Electrical Engineers, March 13, 1906.

Continued from the issue of July 14.

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what can be done in practice if the demand should arise. An incidental advantage in the use of separate units for each frequency is that each vibrator will continue to operate perfectly, even though one or more of the other converters or associated apparatus is disabled. In every case the regular subscribers can be rung, as any of the frequencies can be used for this purpose; also all party line subscribers can be rung, excepting those affected by the disabled frequency. Thus the use of a duplicate set of harmonic converters is not imperative, although desirable, for in case of a breakdown the defective part can usually be repaired very quickly if proper provision has been made.

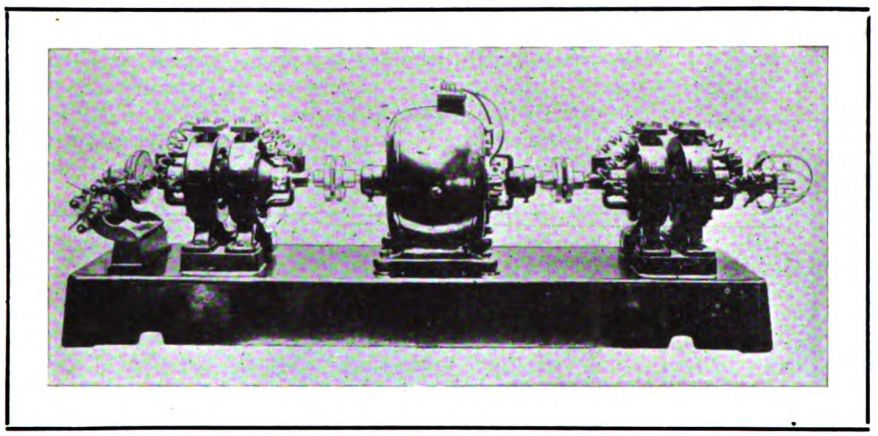

Fig. 15. Motor generator set used for supplying ringing current to selective bells.

The vibrator or pole changing mechanism of the harmonic converter, shown in detail in Fig. 13, is made with massive parts rigidly put together, so that the continual vibration of the armature will not work them loose. The armature itself is made from one piece of tempered steel cut away at its upper part so as to form a thin spring portion as shown at *X* in Fig. 12. This construction obviates the use of rivets, and gives a solid portion of the metal at its top which can be rigidly held in the vibrator frame. The reduced portion of the armature is made rather long so as to give a free and easy armature movement and an indefinite life to the spring. At the lower end of the armature is attached an adjusting weight which is used to get the final tuning of the mechanism to the proper frequency. These weights can be raised and lowered during the process of tuning, and securely clamped in place at the proper position. The main difference in the rate of vibration of the armature is obtained, however, by making its reduced or spring portion of different thicknesses, the highest frequency having the thicker spring. Vibrators constructed on these lines do not vary perceptibly from a uniform rate of vibration, even with great changes in the voltage of the operating circuit. The only noticeable effect is the variation in the amplitude of movement, but this has not been found a serious obstacle when operating within the limits of the voltages usually met with in practice, a change of 30 to 40 per cent. in the case of storage batteries. A governing mechanism is therefore unnecessary, as the proper frequency is always maintained.

The transformers used in the harmonic converter are built after the pattern of those used in electric lighting, with a very efficiently closed magnetic circuit. The amount of iron as well as the design of the windings is varied to suit the frequency and voltage required at the secondary terminals, the lowest frequency having the greatest amount of iron and the smallest voltage. The transformers shown in Fig. 14 are of 55 watts capacity each, excepting that of the low frequency which is made for 25 watts, as not so much power is used in ringing the low frequency bells. The most efficient design of these transformers was found by experiment rather than by following the regular formulæ used in transformer design. When made according to the latter, the exciting or no load current is excessive, due to the character of the alternating current produced by the pole changers. As subsequently shown, the transformers finally adopted are very economical in current consumption, and will stand a very heavy overload.

The first experiments on the harmonic converter were directed towards reducing the number of contact points in the vibrators, and the most promising scheme developed was the use of a double primary transformer with a vibrator having two contacts, arranged one on either side of the armature, and so connected as to cause current to flow first in one primary coil of the transformer and then in the other coil but in an opposite direction. Thus an alternating current was produced in the secondary winding. Condensers were placed across each of the primary windings of the transformers to reduce sparking at the contacts and assist in the circuit action. It was found, however, that the use of two primaries greatly reduces the efficiency of the transformers, giving less output and a greater no-load or exciting current than when one primary is used. Also the breaking of the current at one vibrator contact, which necessarily has a comparatively small amount of movement, limits the output of the machine as well as restricts its use to primary circuits supplied with current at a comparatively low voltage.

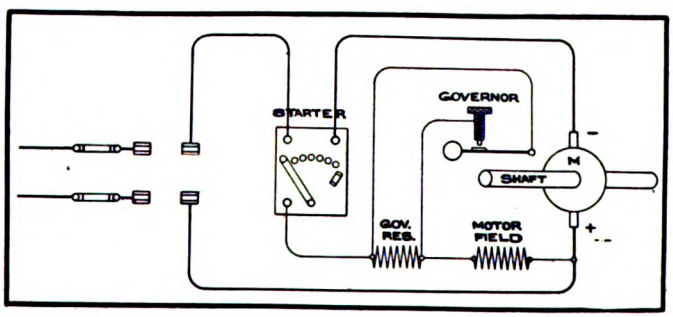

Fig. 16. Connections of "governor" for motor-generator set furnishing current for Harmonic system.

A multiple break and a complete reversal of the current in the vibrator, as shown in the perfected harmonic converter, were thus found necessary to correct these evils. The breaking of the current at the two contact points simultaneously not only reduces the voltage at each break to one-half that of the primary source, but doubles the distance of contact opening in the circuit, thereby allowing the harmonic converter to be operated from the higher voltage primary power circuits.

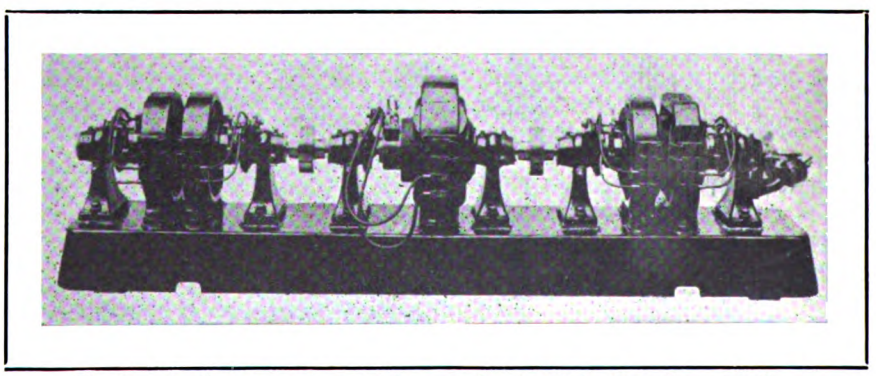

Fig. 17. Another type of generating set for harmonic party line signalling.

It has been found in practice that the various frequencies used in the harmonic system of party line ringing, when produced by properly designed alternating current generators, give no noise

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in the talking circuits, nor inductive disturbances in the lines when ringing. This is probably due to the character of the alternating current which has a curve approaching that of a true sine wave. The use of a transformer and condenser in a harmonic converter tends to smooth out the current curves produced by the pole changing vibrators so that the quiet effect of the sine waves is obtained.

Another and more important problem presented itself when operating the Harmonic Converter from a storage battery of a common battery exchange, as the rapidly recurring changes in potential, due to the action of the vibrators, is sufficiently strong to make the entire talking system noisy. When the exchange battery is of large size and the taps for the Harmonic Converter are taken directly off its bus bars, this noise is only slightly perceptible. But any disturbances of this nature are not to be tolerated in a modern exchange installation, so that efficient means had to be produced to entirely overcome this defect. The use of a retardation coil of sufficient impedance to kill the noise in the talking circuits cuts down the efficiency of the Harmonic Converter to such an extent that its output is not great enough to ring the bells of the party line system. However, a device was produced as shown in the diagram, Fig. 13, which allows the use of a very high impedance coil and still causes the full efficiency of the Harmonic Converter to be retained. This retardation coil is placed in the supply, or feed wire, between the main exchange battery B-1 and the Harmonic Converter, and between them is bridged or floated an auxiliary battery B-2. Like poles of this battery and the main exchange battery are connected to the same wires, so that the auxiliary battery is kept constantly charged, and in fact, called upon for no discharge except when the electromotive force due to the main battery is choked down and prevented from providing a peak current, the deficiency being then momentarily supplied for each wave by the auxiliary battery. In fact, the auxiliary battery may be called an equalizer, since it really takes up and absorbs the noisy back surgings, which would otherwise produce a disturbance in the entire common battery system. This auxiliary source of current supply can be a small storage battery, or even electrolytic cells, but in practice ordinary dry cells have served the purpose.

The power consumption and actual results obtained in practice from Harmonic Converters with 55 watt transformers will serve as an example of the possibilities of this piece of apparatus. With a 22 volt source of current it requires less than 0.58 of a watt to operate the four vibrators, while with the primaries of the transformers connected this consumption is increased to about 6½ watts. The latter figure represents the total no-load power required when the Harmonic Converter is connected for regular exchange service. This machine will furnish power to ring simultaneously over fifty fully loaded lines of four bells each, and while an excessive load, it yet remains in the safe limits of operating. Such a machine will do easily all of the ringing of an exchange of 6,400 lines.

When no direct current source of power is available primary batteries can be successfully used for operating the Harmonic Converter. In the case of small exchanges dry cells are used to a large extent. In any event, it is desirable to have the primaries of the four transformers normally disconnected from the vibrators so that the no-load current will be at a minimum. This is done by means of a magnetically operated switch or relay, which is in turn operated by contacts on the ringing keys. As previously stated, the total no-load power consumed is then less than 0.58 of a watt—the energy required for keeping the vibrators in motion. With small exchanges this no-load current can be eliminated by allowing the vibrators to remain at rest excepting when actually required for ringing. In this case the relay switch just mentioned is made to complete the power circuit to the vibrators and set them in motion each time a ringing key is operated. The armatures of the vibrators are brought into full motion with practically no time loss and with no effect whatever on any but the ringer which it is desired to actuate.

All of these methods of operating the Harmonic Converter have been in actual use in a large number of exchanges for a sufficient length of time to conclusively prove the extreme reliability and great economy of this method of producing harmonic ringing currents.

Telephone Competition and Monopoly*

By F. Dagger.

At the outset I may say that I know of no spot on the globe where monopoly, either government or corporation, is giving an adequate telephone service; i. e., a service which enables the people to fully enjoy all the benefits which should be derived from this method of transmitting intelligence. Further than this, I have no knowledge of any fully developed competitive system which has ever failed to receive a larger patronage than that of a monopoly.

I shall, as briefly as possible, refer to the service existing in the principal countries of the world, where monopoly rules, leaving you to make the comparison with the conditions as you know them to be here after eleven years of competition.

I would ask you to note the very low rate of development in the countries to which I am about to refer, and to remember that according to the most reliable figures to be obtained there is in the United States one telephone to every 20 inhabitants.

In Great Britain, with the exception of competitive municipal plants in five towns, the telephone service is a monopoly in the hands of the government and the National Telephone Company, the latter a corporation whose 25 years record is a very little better than that of the "Bell." On March 31, 1905, the development of the British telephone service had only reached one telephone in 116 inhabitants. In London $83 per annum is charged for unlimited service for the first telephone; subscribers having more than one direct line are charged $69 a year for each additional line. For measured service $25 plus 2 cents a call within the county and 4 cents outside the county but within the London area, is charged. Outside the city, ten party lines are rented at $10 plus 2 and 4 cents a call. The service in London is certainly very bad, the subscribers being unanimous in their condemnation of it. This is mainly due to the fact that the company when it had a monopoly incurred, by its methods, the opposition of the municipal authorities and has never been able to obtain proper right of way facilities, being compelled to use private property, instead of the streets. A few years ago the government established a system in London which was to compete with the company, but before the plant was in operation this policy was reversed and the two undertakings are now working as one system under two managements. The government system, being new, with underground conduits and common battery equipment, gives the best service, but in the absence of competition there is no incentive to reach that standard of excellence which is so conspicuous among the Independent companies in the United States.

In the provincial towns of Great Britain the almost universal charge for service is $49 a year for the first telephone and $42 for each additional line. In small places the rates vary from $39 to $42 for the first telephone; and $36 to $42 each additional line. Where municipal competition exists measured rates are in force, ranging from $25 a year for 1,800 calls to $44 for 5,000 calls. For simplicity I am giving all these rates in even dollars, although they work out at slightly under the value stated.

*Abstract from paper read before the members of the Illinois Independent Telephone Association at their annual convention.

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You will notice that while these rates may appear low for large towns, no provision is made in favor of the residential subscriber. Moreover, the small village and rural district is left entirely out of consideration. This is one of the main causes for the small development of the telephone industry in Great Britain. The equipment of the British telephone systems, with a few exceptions, is of obsolete type and would be quickly converted into junk by the up-to-date Independent manager over here. In short, the telephone monopoly in England has stifled every incentive towards improvement or extension of the service, with the result that telephone conditions to-day are very little better than they were in the United States before the advent of the Independent movement.

In France where the telephone is a state monopoly there is only one telephone to 500 inhabitants, Paris having 50 per cent. of the subscribers in the whole country. The rate in Paris is $80 a year, subscribers purchasing their own instruments and contributing towards the cost of installation, a rule which applies all over France. In Lyons the rate is $59; in cities with more than 25,000 inhabitants, $39; and in smaller towns, $30. The service is very unsatisfactory, so much so that in Paris an association has been formed for the protection of telephone subscribers.

In 1905 the German State telephone system averaged one telephone to 108 inhabitants. Berlin with 66,800 telephones, having one to 28 inhabitants. The charges are based upon the number of subscribers, being as follows:

	Unlimited a year.	Meas. rate plus 1c call a year.
50 stations	$19	$14.25
100 stations	24	14.25
200 stations	29	14.25
500 stations	34	14.25
1,000 stations	36	18.00
5,000 stations	38	21.50
20,000 stations	41	21.50
Over 20,000 stations	43	24.00

Measured service users must pay for 400 calls a year whether made or otherwise.

Unlimited service is the most popular in Germany, it being adopted by nearly 62 per cent. of the subscribers. In Berlin there are less than 13,000 measured service subscribers. The central equipments are of an antiquated type, while a large proportion of the lines are single grounded circuits. Continuous service is only given in the large cities, and the operating is slow and cumbersome.

In Bavaria there are 48,000 telephones, of which Munich and Nuremberg are responsible for 22,000, the average in those cities being one telephone to 35 inhabitants. The development of the whole country is one telephone to 129 inhabitants. The rates are the same as in Germany. Three cities operate on the common battery system, otherwise the conditions resemble the German service.

Austria with a population of 35,000,000 has less than 50,000 telephones, a development of one to 734 inhabitants. The proportion in Vienna is one to 130, the rate in that city being $40 a year. In other parts of Austria the subscriber must pay an installation charge of $20 for each 550 yards of line, and an annual rental of $20.

The development of the Belgian state telephone system a year ago was one telephone to 293 inhabitants. For telephone purposes, the country is divided into seventeen groups or zones, the rates being fixed for unlimited service within each group. These vary from $24 to $49 a year, according to the importance of the particular group. Continuous service is only given in nine groups. Three cities are installed with the common battery system, the other exchanges are magneto, and there are still a large number of single grounded lines.

Switzerland has one telephone to 70 inhabitants. There is no unlimited rate. The measured service charges are—for the first year, $20; the second year, $14; thereafter $8 per annum. Calls are one cent each. These rates appear low at first sight, but as twenty calls a day would with the lowest annual charge amount to $68 a year, the subscriber who has much use for the telephone in Switzerland must find it pretty costly. Continuous service is only given in exchanges of over 300 stations. In the smaller systems a charge of from 5 to 10 cents is made for night calls. This is also a State owned service.

I think I have enumerated all the European countries where the telephone service is operated as a monopoly, and I would ask you to note the very low development of the telephone business in those countries, in contrast with that in the United States at the present time. The average development of these seven countries is one telephone to 279 inhabitants, and I would here remind you that in 1894 the "Bell" companies had 238,000 subscribers' stations, or an average of one telephone to about 300 of your population. Surely no stronger argument can be presented in support of telephone competition than these figures, which I would point out, with the exception of France, were supplied to the Canadian government under the signature of the head of the department administering the telephone service of each country. There can therefore be no question as to their accuracy. I could also refer you to the records of other countries, notably Australia, South Africa, Egypt and South America, in corroboration of the fact that development of the telephone business cannot be looked for under any system of monopoly, whether dominated by a government or corporation. I do not, however, wish to weary you with statistics.

In European countries where the long distance lines and larger exchanges are State owned, and the smaller systems are operated by local companies, there is a higher development. In Norway, where the State owns 27 exchanges with 16,000 subscribers, and local companies 173 exchanges and 21,000 telephones, there is one telephone to 59 inhabitants. In Denmark, where the systems are operated by local companies, there is one telephone to 69 inhabitants. The increased development in these two countries is mainly due to the fact that small towns and villages are operated along almost the same lines as those followed by the Independent companies in this country. The local companies look after the requirements of the rural districts in a manner which no government or great monopoly can ever hope to do. The results are therefore more favorable than in the other countries I have named.

(*To be Continued.*)

INCREASING USE OF TELEPHONES IN MINE OPERATION.

TELEPHONE systems are being installed in many of the mining camps of Mexico. It is stated that not only does a full telephone system insure greater economy by providing a means of instant communication between all parts of the works, but it is a safety appliance as well, and one of the first importance. News of any mishap below ground can be instantly communicated to the people above, enabling them to render assistance at the earliest possible minute.

Mechanical difficulties present themselves in installing underground systems, but recent inventions have practically obviated these, and a proper installation will insure a practical working system. Many mines find it a consideration of value to extend their lines to the nearest town at which there is a telegraph station so that messages can be forwarded immediately.

Both galvanized and copper wire is used, but the latter is considered the better of the two as it is not so readily affected by the water and mine gas. Glass or wood are neither so good as porcelain for supports, and the telephone, if much moisture exists, should be encased in a metal box with an air-tight door, kept shut except when the telephone is in actual use.

Universal attention is being attracted to the telephone as a mining accessory and manifold uses are being noted all the time. The matter is one inviting a careful study as to details making such systems possess the highest efficiency, and mining experts in the United States and Mexico are devoting much time and attention to this study.

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QUERIES

OBJECT OF DIVIDED GROUND.—(729.)

Will you please tell me why it is considered good practice to connect the ground wires for the central office protectors and for the apparatus used to protect the power circuits to separate grounds? Would it not be better to take whatever offered the best ground in an exchange, and connect leads from both sets of apparatus to it? N. F.

The plan of using separate grounds for the two classes of apparatus you mention is followed more as a precaution than because of absolute necessity. It will be readily seen, for instance, that if a discharge should take place to the ground from the power protection panel and the ground were defective beyond the point of connection of the wire, if the central office protectors were connected to the same metallic conductor the heavy current would pass back over this second ground wire, and enter the protectors and secure a path to ground through the cable, relays, or some other place where it would be equally dangerous. By using the separate grounds the danger of such an event is avoided. Of course, if one could be absolutely certain that a perfect ground would always be maintained, there would be very little opportunity for accident if both classes of protectors were connected to the same ground.

OBJECT OF BATTERY SWITCH ON POWER BOARD. (730.)

Will you please explain to me why it is necessary to have a voltmeter switch provided with contact points for each cell of battery in telephone exchanges? Is it not sufficient to be able to take a reading for a whole string of cells, and thus see whether the battery is of the proper voltage? J. B.

The switch of which you speak is usually provided with contact points which enable the attendant to take a reading on the voltage of the charging machine, of a whole string of cells in series, and on each individual cell. The object of having the connections brought out from each cell is twofold. In the first place it facilitates the taking of a reading of each individual cell, so that in case of trouble it is very easy for the attendant to locate the cell which is defective. Previous to the use of this switch it was customary to take a reading of the whole string, as you suggest, and in cases where the voltage did not come up to the proper figure a portable voltmeter was used to go over the connections at the batteries themselves. This, however, was awkward, and naturally there was difficulty in getting good connections, etc. As a consequence its use was slightly unreliable, and moreover it was often considered to be so much trouble to do this that in many cases it was neglected for a time after the low voltage of the string was noted, when the taking of such precaution as soon as the trouble was observed would have prevented serious damage.

Under the plan of bringing the connections out to the switchboard it is customary in most exchanges to take a daily reading of the voltage of each cell, and to enter these readings in record forms. In this way the action not only of the battery as a whole but of each of its parts may be readily known. The sending of the records to persons who have a wide experience in the management of batteries usually enables them to determine at a glance what steps should be taken in case of trouble with the battery which the local force is unable to remedy.

LINE GROUND IN TREE.—(731.)

It has been recently told me that a satisfactory ground for a telephone line could be made by driving a nail in a willow tree and soldering a wire to it. As there are no trees of that sort in our locality I am unable to try the experiment, and would like to ask you if this would make a good enough ground to allow a person to talk and ring on a line. R. G.

In all probability if the willow tree were in a wet place, as they usually are, there would be no difficulty in using the line with a ground such as you mention. This sort of tree is especially troublesome when it comes in contact with telephone and telegraph lines, and men familiar with testing wires which run through such trees frequently tell of finding solid grounds due to contact between their lines and the branches.

Your informant must, however, have original ideas in regard to telephone installations. We have heard of an installer who soldered a ground wire to the leg of a stove, and when questioned said that he thought it must be all right because he had been told the week before that a feed pipe for a boiler was a good ground. If a boiler connection was good, he reasoned, why not a stove?

TRANSPOSITION OF PARALLEL GROUNDED LINES. —(732.)

Running on a pole which extends out into the country for several miles we now have a grounded party line. The addition of new subscribers makes it necessary to run another line on the same poles, and we are told that if we run another grounded line we are likely to get so much cross talk between them that the service will be no good. Is it possible to avoid this cross talk by any scheme of transposition, and if so will you please give it? P. C.

The transposition of two grounded lines run close together on the same poles will do no good. It is only in the case of metallic lines that this is effective in overcoming the cross talk. By making the new line metallic, and transposing it properly, you can avoid cross talk between it and the old circuit.

RING DOWN CIRCUIT ON ORDER WIRES.—(733.)

In your query page of last week you speak of transferring trunk lines from an order wire system of operating to a ring down circuit for night operation. Is it not possible to arrange a signal on the order wire itself which will attract the attention of the night operator to the incoming trunk position, and thus have the business handled in the regular way. C. J.

By putting a ring down signal on the order wire at the incoming end, and making proper arrangements for connecting the ringing current to this circuit at the outgoing end, it is possible to signal the operator when seated at another position, as occurs during the evening and night in many exchanges. The general form of such an arrangement is illustrated in Fig. 733, where the key A is the order wire key, having connected to its inside springs the operator's circuit, and to the outside

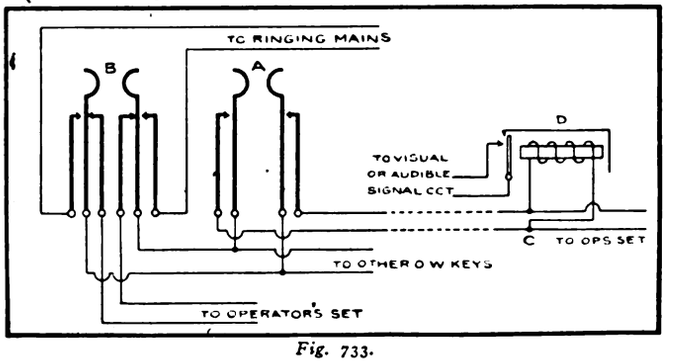

Fig. 733.

springs the order wire leading to the distant exchange. The wires to the operator's circuit are carried through a suitable ringing key B, mounted in a convenient position on the switchboard.

By depressing the order wire key and then the ringing key the current from generator is sent out over the order wire. At the distant end is placed a signalling circuit of some type ordinarily used, for the reception of the signal. This may take various forms, consisting of an ordinary magneto drop, or ring down relay arranged to light a lamp and start the night bell signal. This will attract the attention of the operator, who will go to the proper position, listen to the instructions delivered over the order wire and put up the connection. The use of this circuit in an exchange where attendance is limited will make the operation a little slower at night than when a straight ring down circuit is used.

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THE EDITOR'S PAGE

RED TAPE IN GREAT BRITAIN. THE SLOW MOVING POST OFFICE.

AS is well known the post office has charge of most telephone lines in Great Britain and many consider this to be responsible for the undeveloped condition of the telephone business in the United Kingdom.

We give below a quotation from an English technical paper which seems to throw some light on the question:

"*Telephones for Fruit Growers.*—The Board of Agriculture and Fisheries has been in communication with the Postmaster-General as to the desirability of the further extension of the telephone system in country districts. The Board has been informed that for some years past the post office has been steadily extending the trunk wire system to small towns and building up local exchange systems in rural districts which had previously been left untouched. The Postmaster-General also informed the Board that he will be glad to receive any specific suggestions as to further improvement which may be submitted on behalf of fruit growers, and also as to the localities where the need of the telephone for the purpose of this industry is most pressing."

In this country nowadays conditions are different. If a farmer whispers that he wants a telephone he is lucky if he doesn't find two all put in and working within twenty-four hours.

MAN-TRAINING AS AN INVESTMENT.

NO telephone company would think of putting in a switchboard with only sufficient capacity to serve the subscribers who had contracted for lines at the time the equipment was ordered. No more would any competent engineer lay out a system of conduits provided with so few ducts that it would become necessary to tear up the streets every time a few more subscribers were secured. But when, in many companies the organization of a force to handle this expensive plant and see that it is well kept up and wisely used, is taken up, there seems to be a falling away from the principles applied to investments for inanimate equipment, and instead of exercising a proper foresight the management is often inclined to let things take care of themselves.

Everyone who has gone far in the work knows that the telephone business is no simple thing to understand. There are a great many branches, and before he can have even a general understanding of them all a man must not only be provided with an exceptionally good mental equipment, but he must put in a considerable number of years of good honest work.

The difficulty of obtaining a sufficient number of good men to handle the work which is being done at the present time should be a strong argument in favor of providing for the future.

The only way in which this can be done is by a deliberate setting aside of a certain amount of money for the training of men. If this is done, and the training course, or range of experience, is of the right sort the company need have little fear that a few years from now it will suffer a reduction in earnings through lack of a force sufficiently able to handle its business.

Methods of obtaining the right sort of men, training them in such a way as to make their natural powers develop in lines which will be most useful to the company, and creating an interest which will cause them to adhere to the organization in which their knowledge and experience has been gained deserve the careful consideration and action of the broad-minded manager.

THE SCREECH OF THE MICHIGAN BELL COMPANY.

SINCE the publication in the paper issued by the officials of the Michigan State Telephone Company of an article intended to dash cold water in the faces of the men who are building the Independent system in Detroit the people of that city are wondering if, after all, the Bell men have not lost their ability to see the humorous side of the struggle. Brief reference is made to the previous attempts to establish an Independent system in the city. Although the failure of the first Independent company is alluded to in such tender terms the fact is overlooked that, even though it never got so far as to give much of a service, it was because the men behind it found a more tempting way to get good returns on their investment. Even if two Independent companies did go out of business it was the Bell concern that went bankrupt. So the present Michigan company ought not to worry about the chances which are being taken by the poor people who invest in the Independent companies. The real cause for sadness in Michigan seems to be the losses sustained by the people at the time the predecessor of the present Bell company was sold out by a receiver. In this deal the control passed into the hands of a few Eastern manipulators, and the investments of the small holders at home were wiped out of existence.

As a matter of fact a good part of the money which these people thought was going to be invested in developing the system of the Bell company was used to buy up from the Independent companies, at exorbitant prices, plants which were afterward junked.

At the present day there is hardly a man in Detroit with any knowledge of the circumstances who does not smile at the skilful tactics by which the Bell company was coaxed to follow up its own advances, and one well-known citizen, formerly a sheriff of the county, fairly howls with joy every time he hears the name of the Bell company, thinking of the easy money he made.

This is a good deal too widely known to be denied, and even in the recent article the company practically admits the wholesome respect in which it holds the business acumen of the men who have learned their remedy by the statement, "*The rates, in spite of the tremendous expense to which the Company has been put, as the result of the many efforts that have been made to establish a second company*, are no higher to-day than they were before the Independent company was heard of."

It seems that after all they did not quite dare get their money back at home, and that may be lucky for the people of Detroit. But the wise ones say that what the company is doing is robbing Peter to pay Paul, and the joke is on the Eastern stockholders of the parent concern which has so carefully nursed its wandering child back to seeming health.

The point of the whole case lies in the failure of the Bell company to appreciate the new conditions. It should have learned its lesson from what is going on in other parts of its territory, where Independent systems are making money by giving good service. Not so, however! It still thinks the new company can be bluffed into giving up. It is unable to see that the men who are doing this work know the telephone business. They have learned how to build exchanges, and how to operate them, and it is this kind of knowledge that they are going to use in Detroit. It is time for the Michigan Bell company to look ahead, and, instead of trying to put a stop to the building of an exchange which has too good a start to be killed, to consider how to hold its business after the people begin to get the new service.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

WHEN CIRCUIT IS NOT BROKEN, COMPANY HAS NO NOTICE OF FALLEN WIRE.

Out in the country near this place our wire was broken by a falling tree. The overseer of highways removed the fallen tree and tied the wire to another tree, from which it became detached three days afterward by the wind, falling and injuring a country minister who was driving by on his way to church. The way he was hurt was by the wire catching the top of the carriage in which he was driving about three inches from the top and turning the carriage over into the ditch, which was full of water. Our company did not know of the break in the wire until after the accident, and then promptly repaired it. If the wire had touched the ground at any time the circuit would have been broken and we would have been notified by a discontinuance of communication. Are we liable or not? L. S.

WE do not think you would be in any way liable because until you had notice of the break in the wire you could not be considered as negligent in not repairing it. It was one of those accidents that probably could not be guarded against except by a constant patrol or inspection of the lines, and this no telephone company is bound to maintain. Fitch v. Central N. Y. Tel. & Tel. Co., 59 N. Y. S. 140.

RIGHT TO UNDERBUILD.

Our company has a street franchise requiring that its lines shall be not nearer the street level than twenty feet. High poles were set, allowing for future additions below present lines. Has another company the right to build beneath our lines, thus stopping us from adding new lines below our present high lines? Have there been any decisions regarding this? If so give them.

THE general rule is that underbuilding is not a proper method of construction, but that when one company has to cross or parallel an adjacent company, it should string its wires over those of the other company. This does not depend upon any right of the company which built first to retain space for after additions below its present line. Neither can we say that the company which builds later has no right to stop the company which built first from adding new lines below its present high ones. But the application of the rule would depend upon whether, under the circumstances of each particular case, underbuilding was apt to cause interference with the operation of the prior company's lines. Chicago Telephone Co. v. Northwestern Telephone Co., 65 N. E. 325. Northwestern Telephone Exchange Co. v. Twin City Telephone Co., 95 N. W. 460.

SEPARATE DAMAGES RECOVERABLE.

WHEN plaintiff was in the lawful possession of a telephone instrument at his country house, the poles being furnished by him and the connecting wire by defendant telephone company, and defendant illegally cut the wire, it was held that the plaintiff could recover damages separate and apart from his action on the contract. In re. Cumberland Tel. & Tel. Co., 40 S. 590.

COMPANY NEED NOT PRESCRIBE RULES FOR WORK FOR EMPLOYEES.

AN employee of the Pacific State Telephone Company, being engaged in putting up a telephone cable in Portland, Oregon, was knocked from the pole upon which he was working by the cable falling and striking him. He was an experienced man, familiar generally with the methods of putting up telephone cables, and particularly with the method used by the company for which he was working. He brought suit against the company for damages, alleging that the company failed to provide suitable pulleys or supports for the cable while it was being put up, neglected to make proper rules and regulations for the work, and employed incompetent and unskilful fellow workmen.

Upon the case being appealed to the Supreme Court, the court affirmed a judgment in favor of the telephone company. It held that a telephone company is not bound to provide the latest or most improved appliances and machinery for doing its work, but only such as are reasonably safe and of a kind generally used for the purpose. A company is not liable for failure to furnish or adopt appliances believed by some to be less perilous than those which are actually used and which are reasonably safe and suitable for the purpose intended. In this case the court found that the cable fell, not because of an inherent defect in the appliances, but because the workmen neglected to put the supports sufficiently near together as the cable was being unwound from the reel. It was also decided that "when the business in which the employer is engaged is complicated or dangerous, or where the employees work in different departments or in different sorts of work, and the safety of one depends upon the performance of the duties of another at stated times, or in a particular manner, it is the duty of the employer to provide suitable rules and regulations governing the workman's conduct, and that of the business, but when the duties to be performed by the employee are familiar and the appliances easily understood, rules are not required." The court held that the plaintiff had assumed the risk of injury from the falling of the cable. Blust v. Pacific States Tel. Co., 84 Pac. 847.

POINTING FINGER AT LIVE WIRE IS NEGLIGENCE.

A WIRE of an electric light company in the country was broken by the fall of a green limb which was blown from a tree by a very high wind. A farmer, using a dry stick, looped the wire over the end of a picket in a fence near by, pushing the noose down against the upper rail of the palings. The next day one Leonard Carroll, wondering whether the wire was still charged with electricity, stopped to see. Standing about two feet from a point where the end of the wire was fastened, he seized the top of one of the pickets in his left hand, and, in his ignorance of electricity, pointed his index finger toward the wire which was about eight inches distant, when there was a sudden flash burning his hand and killing him. His mother sued the electric company, and the case going to the Supreme Court of Oregon, it was held that the deceased was guilty of such contributory negligence as precluded a recovery for his death. Carroll v. Grand Ronde Electric Co., 84 Pac. 389.

ONLY ORDINARY CARE NEED BE EXERCISED IN MAINTAINING OF POLES.

ALL that is required of an electric company in the erection and maintenance of its poles for the protection of travellers is that degree of care which would be ordinary under the circumstances. This was the holding of the Supreme Court of Georgia in a suit brought by Mrs. Mary Bell against the Savannah Electric Company. She alleged that a pole belonging to the company and maintained by it in the city of Savannah had been allowed to decay and get in a defective condition; that while the plaintiff's daughter was passing the pole, it fell to the ground striking and killing her. A judgment for the plaintiff was affirmed. Savannah Electric Co. v. Bell, 53 S. E. 109.

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IN THE OPERATING FIELD

RURAL TELEPHONE LINES BRING ABOUT CAPTURE OF BURGLARS IN OHIO.

NOT to be outdone by cities, where its use in connection with police service is one of the regularly advertised features of the telephone system, the people connected to rural lines near Marion, Ohio, have used the telephone to good advantage in the case of a recent robbery.

Franklin Roberts, a farmer, on returning to his home after a brief absence discovered that the house had been entered and several articles had been taken away. He immediately went to the telephone and called up the farmers throughout this part of the country for a considerable distance, and it was only a short time before the use of the different lines enabled a group of men to determine in which direction the suspected persons had gone, and set out to follow them. The men were soon captured and locked up.

NEW YORK COMPANY TAKES DOWN THE BLUE BELL.

A CONSIDERABLE increase in the number of local connections available has been made by the Eastern New York Telephone Company of Hoosick Falls, through a service agreement with the Johnsonville Telephone Company. The latter company, which operates lines in the vicinity of Johnsonville, was formerly a sub-licensee of the Hudson River (Bell) Company, but has discontinued this arrangement.

The Eastern New York company has prepared to handle the increased business by the addition of 100 lines to the switchboard, with a corresponding increase in the operating force. Many contracts for business service on a new rental basis have recently been taken, and men are busy putting in the instruments.

CLEAR LAKE COMPANY DOING WELL IN SOUTH DAKOTA.

AT the annual meeting of the Clear Lake Telephone Company held recently at Clear Lake, S. D., the affairs of the company were found to be in a very satisfactory condition. A dividend of $7 per share was declared and the following officers elected for the year: Wm. Konold, president; C. H. Gile, vice-president; E. F. Kohnke, secretary, and John A. Thronson, treasurer.

During the past year the company has built a considerable amount of new lines and expects to extend its wires into a number of adjacent towns during the coming months.

INVESTIGATION OF TELEPHONE SERVICE TO BE UNDERTAKEN BY COUNCIL AT MACON, GA.

UNSATISFACTORY service is said to have been the cause of the passage by the Council of Macon, Ga., of an ordinance appointing a committee to look into the matter, with the object of framing regulations which will compel an improvement.

Some of the people in the city are anxious to open negotiations with one of the Independent companies, with a view to the establishment of a competing plant.

TOLL LINE SERVICE OF THE CENTRAL STATES TO TAKE ANOTHER JUMP.

AN early expenditure of $200,000 upon new construction is said to be included in the plans of the United States Long Distance Telephone Company. So rapidly has the amount of toll business been growing that large amounts of new construction are necessary in order to provide sufficient wires for handling the connections which are desired between one city and another. It is said that additional new lines are to be strung from Cleveland to Toledo, and that wires from the latter place to Findley and Fremont are to be strung; there will also be a number of other lines from Cleveland to Elyria, Lorain, Berea, Warren, Chagrin Falls, Canton and Akron. The use of these individual through circuits will enable the company to handle the business in a way which will be most satisfactory to the subscribers of the various companies with which it connects.

NOVEL SCHEME FOR OBTAINING SUBSCRIBERS ADOPTED BY A NEW COMPANY.

AT New Castle, Pa., the residents of the town have recently organized a telephone company to compete with concerns which are operating present systems, and which are said to have been giving unsatisfactory service. It is the intention of the new organization to have its stock entirely owned by local people if possible, and to have it widely distributed. Considerable success has been experienced up to the present time in disposing of the stock, but in order to hasten the movement, and provide money for immediate construction, the directors have determined to offer prizes to the people who secure the greatest number of subscriptions for stock of the New Castle Telephone & Electric Company before midnight July 31. The prizes are a first, second and third, of $100, $75, and $25, respectively.

BELLEVUE, OHIO, COMPANY INCREASES CAPITAL FROM $10,000 TO $100,000.

AT a meeting of the stockholders of the Bellevue Home Telephone Company of Bellevue, O., it was decided to increase the capital stock from $10,000 to $100,000. A limited amount of stock will be offered for sale, the proceeds to be used in rebuilding and improving the exchange. Cable is to be laid and a thoroughly modern system installed.

The affairs of the company are said to be in very good condition. Many country lines have been built during the past year and the number of telephones, now 800, is steadily increasing.

NEW BUILDING FOR THE INDEPENDENT COMPANY AT PORTLAND, OREGON, NEARLY COMPLETE.

THE Home Telephone & Telegraph Company, of Portland, Oregon, has nearly completed its new building, which will contain the switchboard and offices for the management. It is a massive two story structure, with a high cement basement which will be used for the power and terminal apparatus. From the outside the building presents a most substantial and agreeable appearance. Within a very short time it will be ready for the installers to take up the work of placing the equipment.

OHIO FARMERS DECIDE IN FAVOR OF INDEPENDENT CONNECTION.

THE farmers in the vicinity of Tiffin, Ohio, have decided to connect their lines with the exchange of the Tiffin Home Telephone Company instead of with the Bell system.

New lines will be built connecting every farm in Seneca county with Independent exchanges located in the villages and at other convenient points. It is expected that at least 3,000 subscribers will be connected during the next few months.

NEW TOLL BOARD FOR HOME COMPANY AT JOPLIN, MO.

CONTINUED improvements in its plant are being made by the Home Telephone Company of Joplin, Mo. The latest work to be taken up is the installation of a selective signalling system on party lines. Within a short time a new board will provide for the more efficient handling of toll business, the bulk of which has been growing rapidly.

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TELEPHONE PATENTS

TELEPHONE TRANSMITTER.

W. W. Dean, Chicago, Ill., patents (No. 819,267; dated May 1, 1906; filed Oct. 27, 1902; serial No. 128,883) and assigns to the Kellogg Switchboard and Supply Company, Chicago, Ill., a transmitter.

The primary object of this invention is to provide a transmitter in which a large variation of resistance without complication of parts is obtained.

This is accomplished by stamping a forwardly extending cup in the centre of the diaphragm, this cup forming the retaining chamber for the granular resistance material.

A second diaphragm of mica serves to close the rear portion of this chamber.

The location of the chamber in the diaphragm causes a constant movement of the carbon particles, thus maintaining them in a sensitive condition.

SEMI-AUTOMATIC SYSTEM.

Edmund Land, Grand Rapids, Mich., patents (No. 818,540; dated April 24, 1906; filed March 20, 1905; serial No. 250,933) a semi-automatic telephone system.

In this invention means are disclosed for the interconnection of subscribers' lines which are provided with automatic signal sending devices. As the operations are involved and would require more space for a complete analysis than is at our disposal, we would suggest that parties interested procure a copy of this patent for their personal investigations.

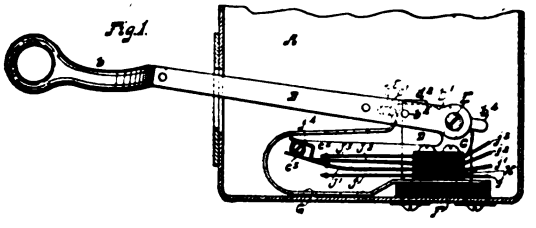
AUTOMATIC APPARATUS.

John Erickson, Chicago, Ill., patents (No. 819,050; dated May 1, 1906; filed December 30, 1904; serial No. 238,905) and assigns to the Automatic Electric Company, Chicago, Ill., an indicating device for automatic telephone switches.

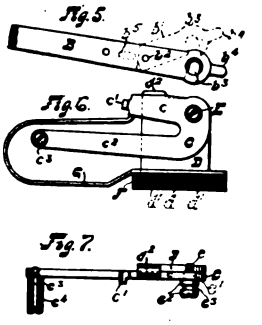
The object of this invention is to decrease as much as possible the sending of false alarm signals over the special circuit associated with the mechanism of each subscriber's line. Parties interested should secure a copy of this patent for their personal investigation as the principles involved require more space for a clear elucidation than we have at our disposal.

TELEPHONE HOOK SWITCH.

Herbert L. Knight, Cleveland, O., patents (No. 825,397; dated July 10, 1906; filed March 15, 1905, serial No. 250,232) and assigns to the Williams-Abbott Electric Company, Cleveland, O., a telephone hook switch.



This invention relates to a hook switch the forked portion of which together with the lever arm is designed to be readily removable for convenience in shipping. Referring to the illustrations: A is the usual box of the telephone. The portion B of the operating lever is intended to be removable, while the U-shaped portion, C, remains permanently mounted on the stud pin, E, which serves as a pivot. The arm B is also mounted on pivot E and is held in place by a latch (Fig. 5) pivoted at b^2 on arm B and engaging the stud pin E in the groove e^3. Besides



fitting on E the arm B has an aperture b^3, which is designed to receive the lug c^1 of the U-shaped portion of the lever, C, and thus cause the two parts of the arm to work in unison.

SUPPORTING ARM FOR TELEPHONE TRANSMITTERS.

Sidney A. Beyland, Elyria, Ohio, patents (No. 823,758, dated June 19, 1906; filed May 12, 1904; serial No. 207,664) and assigns to the Dean Electric Co. of Elyria, Ohio, a supporting arm for telephone transmitters.

The inventor aims to construct a transmitter arm of the usual form which shall, with the base to which it is pivoted, form an arrangement capable of completing electrical connections to the transmitter automatically at the time the arm is placed upon the backboard. The base is provided with metallic clips which are the terminals of the transmitter circuit and which engage with corresponding contacts on the backboard. This device makes it possible to remove and replace the transmitter arm and its base from the backboard without the necessity of cutting wires or disturbing soldered joints.

TELEPHONE SWITCHING APPARATUS.

Robert A. Walton, Los Angeles, Cal., patents (No. 823,091; dated June 12, 1906; filed July 25, 1905; serial No. 271,231) a telephone switching apparatus.

The object of this invention is to provide means for temporarily cutting out the transmitter if the user should so desire during a conversation. A small switch is mounted in the transmitter case with a handle projecting outside, furnishing a means for controlling the circuit by anyone using the telephone. The wires of the transmitter circuit are run to this switch and are so connected that the transmitter is rendered inoperative when the switch is opened.

TELEPHONE SYSTEM.

George Ritter, of Stuttgart, Germany, patents (No. 814,478; dated March 6, 1906; filed June 16, 1904; serial No. 212,805), a telephone or telegraph system.

The object of this invention is to provide means for creating and maintaining a secret circuit between any station on a party line and the exchange. This the inventor accomplishes by means of an auxiliary wire common to all stations which includes in circuit with it suitable relays to control the local circuits of the sub-stations. When a subscriber desires a secret circuit to the exchange he manipulates a special key, which causes all the stations except his own to be locked out.

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TELEPHONE PATENTS

MOUTHPIECE.

H. J. Guttman, Chicago, Ill., patents (No. 819,059; dated May 1, 1906; filed Oct. 21, 1904; serial No. 229,390) and assigns to the Automatic Electric Co., Chicago, Ill., a transmitter mouthpiece.

In this invention means are disclosed for the manufacture of a mouthpiece out of drawn steel or other suitable metal.

The mouthpiece is made in two parts: one, the funnel, is provided with external threads on its smaller end for attachment to the transmitter and has an internal shoulder adjacent thereto, to which is attached the second portion, consisting of a perforated diaphragm, employed to protect the internal parts of the transmitter from injury.

STORAGE BATTERY SYSTEM.

Talbot G. Martin, Chicago, Ill., patents (No. 819,073; dated May 1, 1906; filed December 12, 1904; serial No. 236,640) and assigns to the Automatic Electric Company, Chicago, Ill., a means for charging storage batteries for telephone exchanges.

This invention relates to the system for charging the storage battery at a manual exchange with current from an automatic exchange, and has for its object, the use of a trunk, when not being employed for talking purposes, for supplying charging current to the storage battery.

As this patent involves automatic mechanism and circuits which would require more space than we have at our disposal to enable us to give a clear conception of the system we suggest that parties interested procure a copy for their investigations.

LAMP JACKS.

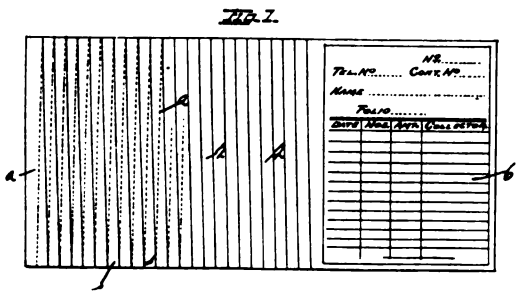
Michael Setter, Chicago, Ill., patents (No. 819,085; dated May 1, 1906; filed January 13, 1905; serial No. 240,965) and assigns to the Automatic Elec. Co., Chicago, Ill., a design for a strip of lamp jacks.

The object of this invention is to provide a mechanical construction which will not be affected by the heat of the lamps. This the inventor accomplishes by employing a metal frame, one edge of which is bent at right angles and perforated with openings to form a support for the jacks.

MEANS FOR KEEPING RECORDS OF COIN-REGISTER TAPES.

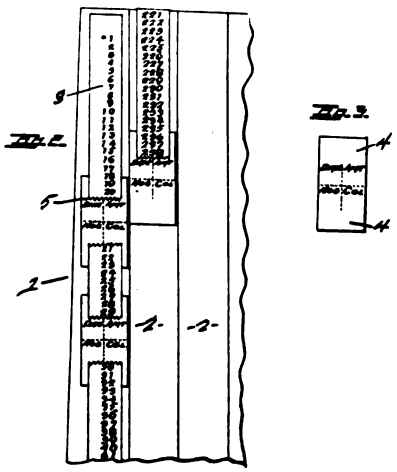
William G. Nagel, Toledo, O., patents (No. 824,196; dated June 26, 1906; filed Septemper 13, 1905; serial No. 278,207) and assigns to the United States Coin Register Company means for keeping records of coin register tapes.

This invention provides a means for keeping a record of the



collections at telephone pay stations of the class in which there is a tape on which are printed the number of the station, the amount paid, etc. The inventor describes a plan whereby the collected sections of the tape are mounted on a card so as to be easily filed and preserved.

When agents of the telephone company make collections at the stations the free end of the tape is severed by being drawn over a suitable cutting edge on the register. The detached portion is then turned in to the office together with the money collected and, since each deposit is recorded on the tape, the amount turned in must correspond with the record. In Fig. 1 is shown



a sheet of cardboard or other stiff material on which the tape is to be wound spirally as indicated by the lines 2, which are slightly inclined from the vertical. Similar lines on the opposite side of the card are indicated by the dotted lines. Beginning at the upper left hand corner of the card the tape is fastened by pasting and then wound about the card following the path shown. To secure the ends of the sections the sticker shown in Fig. 3 is provided, having the entire back and the face at ends 4—4 gummed. The severed end, 5, of the tape is first fastened to the sticker, which is then fastened to the card, and, when brought in, the severed end of the next section is fastened to the sticker.

The sticker is provided with spaces for the date of collection, initials of collector, etc., as shown in Fig. 3. On each face of the card is a space, 6, to show in tabulated form the various data contained on the several stickers. At the top of this space may be indicated the number of the card for the purpose of indexing, the telephone number, the name of the subscriber, and such other data as may be found essential or convenient.

TELEPHONE SWITCH-HOOK.

Harry J. Guttman, Chicago, Ill., patents (No. 819,061; dated May 1, 1906; filed Nov. 25, 1905; serial No. 289,046) and assigns to the Automatic Electric Company, Chicago, Ill., a switch-hook.

The object of this invention is to provide an economical and simply constructed switch-hook in the design of which certain details and improvements are incorporated. These results are obtained by first stamping out of sheet metal a blank which is afterwards bent and adjusted in form to the requirements of the particular switch mechanism which it is designed to operate.

CONDUIT MACHINE.

Claude Girardot, Vitry-Le-François, France, patents (No. 818,158; dated April 17, 1906; filed January 3, 1905; serial No. 239,509) and assigns to Le Société J. et A. Pavin de Lafarge, Viviers, France, a machine for manufacturing conduits from cement.

This patent has for its object the provision of mechanical means for ramming the conduit material into a homogeneous structure throughout its entire length which the inventor claims is unattainable by hand process of manufacture.

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WHEN JOHN WANAMAKER HAS

1600 INSTALLED IN ONE STORE IN PHILA. YOU KNOW JOHN KNOWS.

You Gan Depend on Grays, As We Don't Have Levers, Springs, Etc.

GRAY TEL. PAY STA. CO. HARTFORD, CONN.

LARGE CATALOGUE 1906
No. 10 SHIELD Automatic

FOR SALE

For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE—We have on hand at Forth Worth, Texas, a complete 100 line Fisk-Newhall latest type tubular drop express switchboard just out of the factory and never been used. We will sell with all or part of drops installed at a bargain. Address Wesco Supply Co., 7th street and Clark avenue, St. Louis, Mo. 642.

FOR SALE—At a bargain, three 100 drop Express type switchboards all in good working order. Will sell either the drops or the entire board. Address, Covington Home Telephone Company, Covington, Ohio. 646

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

WANTED—Every wire chief to write for our proposition as a side line. No samples, no time lost from regular work, good pay. Address Jester & Millikan, Marion, Ind. 643.

WANTED—Two or three first class trouble and P. B. X. men. No others need apply. State experience and wages expected. Address, Box 647, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 647

DRAUGHTSMEN—Mechanical, electrical, structural, architectural—are at a premium. In a recent issue of "Opportunities," our monthly publication, we listed 104 positions for draughtsmen at salaries of $900-$2,500. Sample copy of "Opportunities" is free for the asking. Hapgoods, 305 Broadway, New York. 464

WANTED—Continued

WANTED—Cableman. Position permanent. Address Zenith Telephone Company, Duluth, Minn. 644

WANTED—Position as manager of telephone system not smaller than 1500 subscribers. Have served present employers five years as manager. Am graduate in telephone engineering. Netted my company 25 per cent on the investment last year. If you want dividends, write me. Can furnish best of reference from present employers. Salary reasonable. Address, Box 648, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 648

WANTED—Young man with all round experience desires position as superintendent or manager of progressive company, where a steady purpose is appreciated. Let me hear. Address Box 637, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 637

WANTED—Chief operator desires to change location. Experienced operator on large multiple boards. Now handling 15 operators. Can give best of references. Address Box 633, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 633

WANTED—General foreman for district Bell company just outside of New York City; must be competent and well recommended. State past experience and salary expected in application. Address Box 640, care THE AMERICAN TELEPHONE JOURNAL, 100 William Street, New York City. 640

EVERY COIL

of **Roebling Double Galvanized Telephone Wire** bears a tin tag and lead seal upon which the word "**Roebling**" is stamped.

Don't accept Wire without the **Roebling Seal.**

JOHN A. ROEBLING'S SONS CO., - TRENTON, N. J.

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

"IT PAYS TO EXHIBIT AT CONVENTIONS."

SUCH is the expression of the United States Coin Register Company of Toledo, O., in view of recent orders.

The most hearty approval of the men who saw the device a few weeks ago seems to have been won for the new recording pay station shown by the company. It was generally agreed that the use of the consecutively numbered tape and the extremely simple accounting system which it is possible to introduce makes it impossible for the telephone company to be deceived in its collections.

Another important feature possessed by this pay station is the use of a single gong, which is struck one blow for each nickel deposited. In this way any chance for an operator to be confused by her inability to distinguish between a number of tones is avoided.

THE COLMAN J. MULLIN COMPANY, 430 Kent avenue, Brooklyn, N. Y., has just issued a leaflet describing the Gem Wire Grip, a device which has won the approval of the construction departments of many large companies.

The treatment of the subject in this leaflet shows that the author is thoroughly familiar with the work of cable drawing from a practical standpoint, and that the grip possesses qualities which make its use a source of economy.

THE DEAN ELECTRIC COMPANY, Elyria, O., reports among other recent orders the following: Seneca County Home Telephone Company, Seneca Falls, New York, for a 1,000 line Dean full multiple switchboard, equipped with 320 local and twenty rural lines; the West Shore Home Telephone Company, Catskill, New York, a 1,000 line Dean full multiple switchboard, equipped for 320 local and twenty rural lines; also the Clinton Telephone Company, Plattsburg, New York, the first exchange installed by the Dean Electric Company, has placed an order for 160 lines additional capacity, and for changing from multicycle ringing machines to the Dean Harmonic Converters.

THE CENTURY TELEPHONE CONSTRUCTION COMPANY, Buffalo, N. Y., has recently added four positions to the common battery switchboard of the Ithaca Telephone Company, Ithaca, N. Y. It is also installing a complete common battery equipment at Attica and Friendship, N. Y., and has recently completed the installation of a common battery, 4 party selective board, at East Aurora, N. Y.

FRANK B. COOK, 238 West Lake street, Chicago, Ill., has a new complaint, something most men don't care to worry about. The orders are coming in too fast for the capacity of the factory. Mr. Cook says he is particularly busy on orders for his Type B-4 Subscribers' Station Protectors. This is the protector that was recently approved by the Board of Underwriters, and which is said to be fitted with a fuse that will not explode or flash when it operates. Among the recent orders which he has received for this protector are those from Paris, Ill., 1,000; Cuyahoga Telephone Company, Cleveland, Ohio, 3,000; Quincy, Ill., 2,500; Terre Haute, Ind., 1,100; Atlanta, Ga., 600; Bloomington, Ill., 500.

WATER-TIGHT TELEPHONE SYSTEM FOR BATTLESHIPS.

THE following description and illustrations relate to the special telephone system designed and built by The Holtzer-Cabot Electric Company, Boston, Mass., for the Naval Department of the United States Government. Five similar systems were purchased by the government and installed upon the following battleships: "California," "South Dakota," "Milwaukee," "Indiana" and the "Connecticut." To meet the especially severe conditions which obtain on shipboard there were incorporated a number of novel and original features.

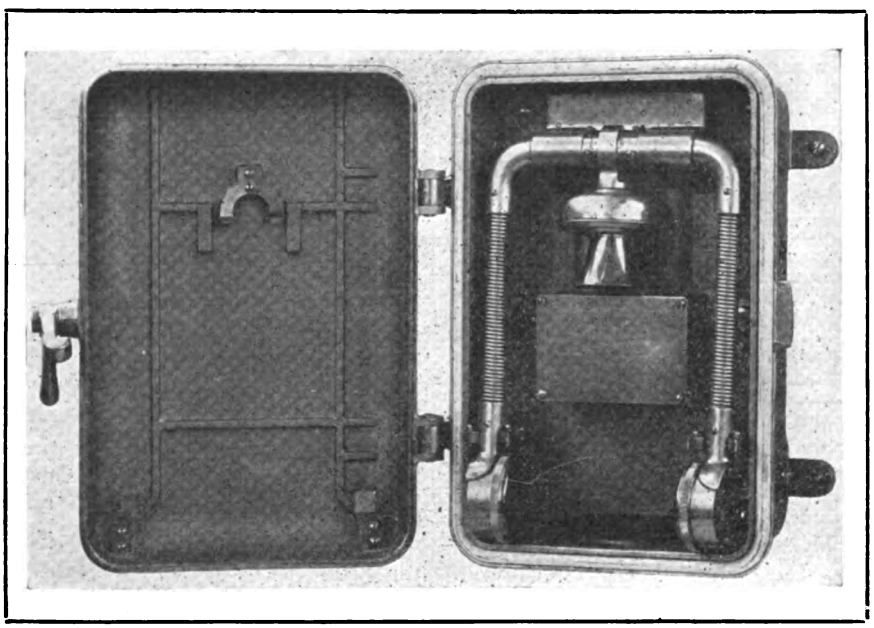

Fig. 1. Special water-tight telephone, built for naval service by the Holtzer-Cabot Electric Co

It was especially desired that the instruments be unaffected by the action of the air, the movement of the vessel, or the concussion of the heavy guns, and the switchboard and exposed stations were to be made absolutely water-tight.

Figure 1 represents one of the water-tight stations. The operating parts are mounted on a frame plate which can be readily removed from the case without the use of tools and without disturbing any of the connections. One of the distinctive and original features of this station is the double receiver, the two receivers operating independently of each other so that either or both may be used. The act of raising one of them to the ear brings the transmitter into the proper position for talking and signals the switchboard. When released all parts return to their normal condition, making it impossible for any user to leave the telephone connected to the line. The receivers are of the watchcase type, double pole, with metal cases, the coils being specially treated to make them waterproof. The transmitters are of the solid back type, the chamber being hermetically sealed, there being used nothing that will be affected by the moisture. The arms will support a weight of 200 pounds. The case which encloses the station is of composition, polished and oxidized and provided with a channel into which is fitted a molded gasket of pure rubber.

The non-water-tight stations (figure 2) are interchangeable with the water-tight telephones, the operative parts being mounted upon a mahogany base instead of in a metallic case.

With each station there is furnished a separate water-tight vibrating call bell. The design of the mechanism of this bell is distinctly special, the blow being delivered to the gong through a phosphor bronze diaphragm, which is reinforced so that there is

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Remember

that the poles you are now putting in will all need to be replaced in a few years. In some climates they will last longer than others, but when they do rot out they will all go at once, and the combined expense is going to be heavy. Why not put off this date? ¶ Why not use Avenarius Carbolineum and by more than doubling the life of your poles cut out this bill entirely?

Absolutely prevents rot — Easily applied

Write for information

Carbolineum Wood Preserving Co.

Sole United States Agents

Milwaukee, Wis.

Mr. MANAGER,

? IS YOUR Exchange Growing

Is your Office Accounting and Filing System adapted to expand with your growth?

If not, we can furnish you one that will! Write for descriptive booklet.

Our Special Copyrighted Forms will save you money!

Loose Leaf Lease Records, Bound Books, Special Ruled and Printed Forms, Card Systems, Filing Cabinets, etc., etc.

Send us Sample Sheets of Special Forms for lowest estimates.

Extensive facilities enable us to accept orders of any magnitude and insure prompt delivery.

INDEPENDENT LOCAL AND LONG DISTANCE TELEPHONE

Coupon Books

Toll Tickets
Toll and Rental Bills
Monthly Check Reports
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Exchange Directories
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Telephone Systems Department

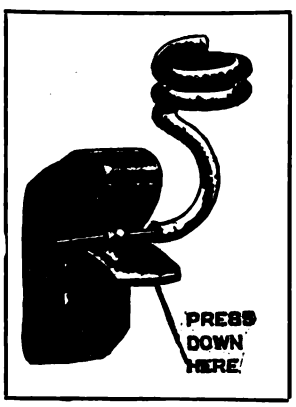
THE Edwards-Hine Co.

5-7 PEARL STREET, GRAND RAPIDS, MICH., U. S. A.

Mention American Telephone Journal.

Why Dealers Should Push the Sale of Batteries Equipped with

FAHNESTOCK SPRING BINDING POSTS



This post eliminates loose and dirty contacts and holds the connecting wire firmly without cutting it.

The tension of the spring grip automatically adjusts itself to the size of wire, being less for a fine wire than a heavy one. (This feature is unattainable with any type of screw post.)

It is unaffected by vibration and never releases its hold.

No tools are required to attach or remove the connecting wires. (All other types require the use of a screw driver or a pair of pliers.)

Summing up the above advantages, it is evident that the maintenance charges are reduced by its use. Hence, if you fill your battery orders with this equipment, you please and hold your customers.

You need their trade? Then give them a square deal in filling battery orders.

FAHNESTOCK ELECTRIC CO,

129 PATCHEN AVENUE BROOKLYN, N. Y.

PROFIT

Toll lines are costly and you can't afford to let the public use them free of charge. Yet this is what you are doing when you fail to collect overtime charges.

THE CALCULAGRAPH

counts every minute and increases the revenue from your toll lines. Gives a printed record of each call showing time connected and elapsed time.

It makes no clerical errors.

Write for booklet.

THE CALCULAGRAPH COMPANY

1437 Jewelers Building New York City

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no danger of its being worn through by use. The parts of the bell are made of non-oxidizible metal with the exception of the iron and steel parts which are copper plated and lacquered to prevent corrosion.

The operative parts of the switchboard are mounted in a heavy brass case, shown in figure 3. This is gasketed so that when the cover is closed it is absolutely water-tight. The case is divided into two compartments, the upper containing the terminals and the lower the switchboard proper. The upper part of the case is drilled for 2" conduits. The terminals are of heavy copper lugs and are insulated with mica. A distinguishing feature of the board is that the connections are made without cords, there being used specially designed keys instead. The front of the switchboard is sub-divided into vertical strips each holding four keys. By taking out two screws any one of these strips may be removed, exposing for examination every contact and connection on the strip. The whole front which supports the case and signals is hinged at the bottom so that it may be readily let down, allowing the cables to be examined. A supervisory signal is provided with each connecting circuit, the purpose of which is to indicate when the conversation has been finished.

Provision is made for connection with shore exchanges, the signaling current being obtained from a hand power generator which is held in the box at the right of the cut. The system will work in connection with either a common battery or magneto exchange.

Current for the transmitters is taken from a Holtzer-Cabot motor generator of the noiseless type. These circuits draw their current directly from the motor generator, there being no storage batteries. The ringing current is obtained from the ship's ringing dynamotor, or in case of disability from an emergency set of dry batteries. The system operates on a three wire circuit and five conversations can take place at the same time, or any number of stations can be connected and an order transmitted simultaneously to them from any other station.

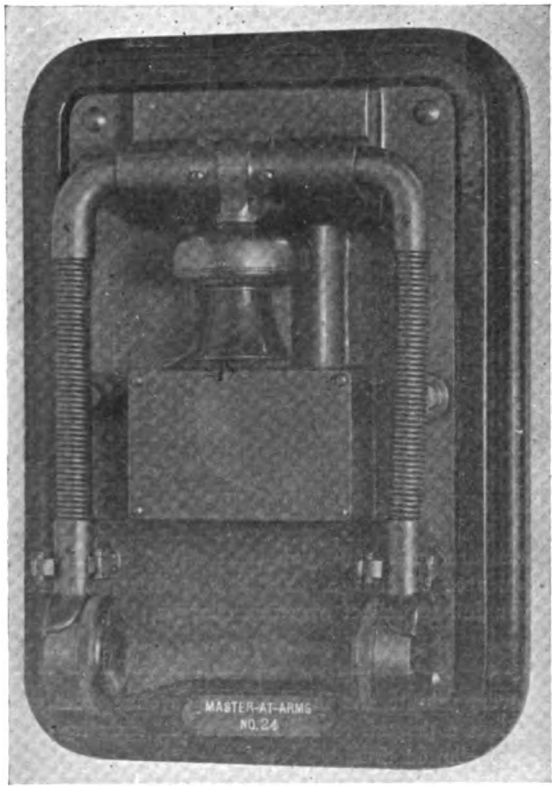

Fig. 2. Naval type telephone made by the Holtzer-Cabot Electric Co. for locations not exposed to moisture.

The system as a whole has been built with a special view to ruggedness so that nothing short of actual violence can cause injury.

THE BLAKE SIGNAL AND MANUFACTURING COMPANY, 246 Summer street, Boston, Mass., reports largely increasing sales of its insulated staples and compressed cleats among telephone companies. The idea that by the use of these two specialties in combination the requirements of inside wiring may be completely met seems to be rapidly spreading.

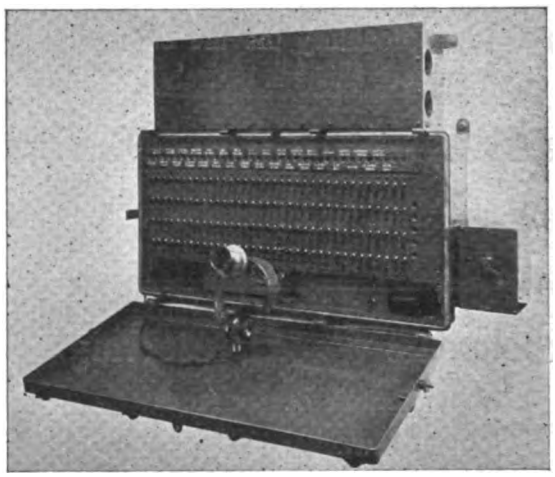

Fig. 3. Switchboard manufactured by the Holtzer-Cabot Electric Co. for naval service.

THE CARBOLINEUM WOOD PRESERVING COMPANY, Milwaukee, Wis., has issued a booklet containing a group of photographs of important structures to which its preservative compound, Avenarius Carbolineum, has been applied. Aside from the fact that these are good views of interesting places, they show that this compound has received the approval of some of the most competent engineers and largest business interests in the country.

THE ELECTRIC APPLIANCE COMPANY, Chicago, Ill., has recently closed a contract with the Northern Illinois Telephone Company, of Sandwich, Ill., for a four hundred and fifty line switchboard. It will be of the latest self-restoring drop type, with one-hundred and fifty drops to the section, fifteen cord circuits, and twenty transfers for connection with toll board. This company has recently issued a booklet entitled "How to Buy a Farm 'Phone,' which contains valuable information relative to building lines and other telephone work. New bulletins on switchboard and electrical supplies have been prepared and the company is in a position to submit quotations on complete exchange outfits. The new No. 27 catalogue is being sent to a large list of customers, and prospective buyers, not on the mailing list, can receive a copy by making a request.

THE EWING-MERKLE ELECTRIC COMPANY, 1106 Pine street, St. Louis, Mo., in its July number of the "Everbest Magazine" presents, as usual, a group of very interesting short articles and some good verses. The paper is illustrated with a number of clever drawings. Appropriate articles describing some of the specialties sold by this company are included. Copies will be sent free of charge to all inquirers.

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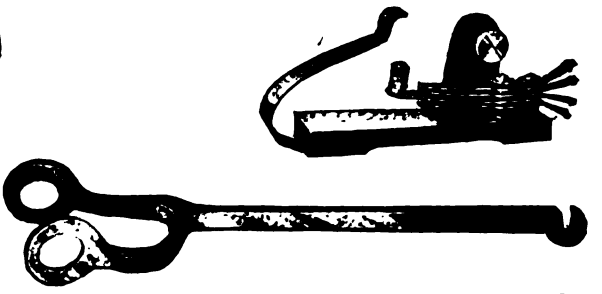
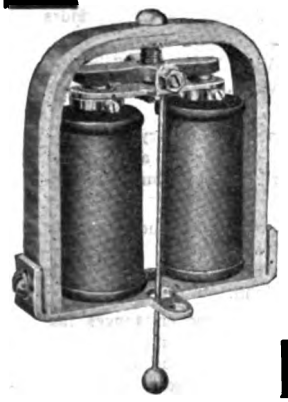
DON'T BE SHOCKED



¶ The "Andrae" Detachable Hook Switch has removed any possible chance of it. And it's the only hook switch that does prevent it.
¶ Made just as nearly perfect as possible.
¶ Self-contained—has no equal for perfection of contacts.
¶ Can be removed without moving the contact springs or altering the adjustment in any way. Contact points made from pure platinum.

"Andrae" Ringers Never Lose Magnetism



¶ The U shape prevents the loss.
¶ And the ringer is as simple as A B C. The only tool needed in adjusting it is a screwdriver. The cores of these ringers are of double annealed, Norway iron, and are wound with all silk wire. Gongs are mounted separately, and the ringer movement may be removed from the box by loosening the wood screws which hold it, without disturbing the gongs.

Write for free illustrated catalog, which explains everything connected with telephones.

JULIUS ANDRAE & SONS CO.
99 West Water Street, Milwaukee, Wis.

Bridging Telephone.—Type M.
This style of cabinet also made into:
3-Bar, Series, Type "K"
4-Bar, Bridging, Type "L"
with any ringer resistance desired.

Western Pioneer Telephone

Five-Bar Bridging

Our **New Western Pioneer** telephone can be furnished for all classes of **special service** such as **ring through, non-interfering, divided circuit, central checking party line** and in fact can be used where any generator call telephone is now being used. The apparatus used in this instrument is of **New Western design.**

The **common battery type** of **magneto telephone** is becoming popular. The cabinet is compact and neat in appearance, all parts are **conveniently mounted,** the wiring is simple and the cabinet will accommodate a **three, four or five-bar generator.** We manufacture all of the parts used in this instrument. When the upper compartment is open the generator, ringer, hook switch, induction coil and receiver binding posts are exposed. When the battery box is removed by sliding downward, the batteries and battery connections are exposed.

WRITE FOR OUR GREEN BOOKLET

WESTERN TELEPHONE MFG. CO.
"The Pioneer Independent Telephone Factory"
Established 1893
58 W. Jackson Boulevard, Chicago

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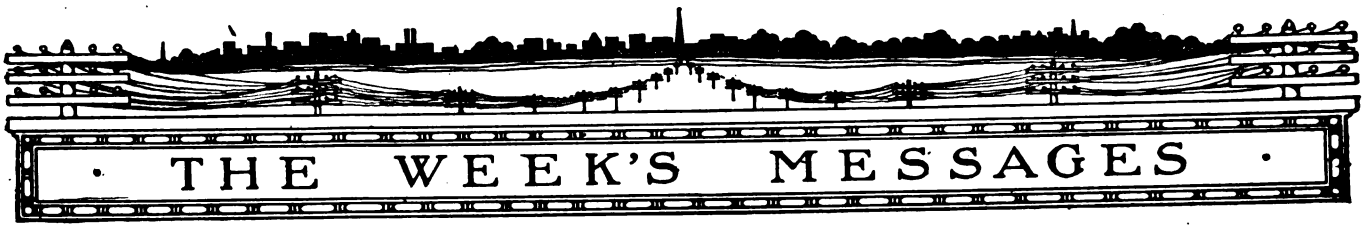

NEW COMPANIES.

COLUSA, CAL.—A farmers' telephone company is being organized at Colusa by Dr. Rathbun, who recently purchased the county franchise. The construction of the company's lines, which will cover the entire county, will be commenced at once.

MAQUON, ILL.—The Maquon & Southwestern Telephone Company, with a capital stock of $2,500, has been incorporated to construct and operate a telephone system at Maquon. The incorporators are Asa Rambo, T. C. Grabill and C. D. Briggs.

WINDSOR, ILL.—Articles of incorporation have been filed by the Windsor & Richland Township Mutual Telephone Company, Prairie Schoolhouse, Shelby County, Ill. The capital stock is placed at $2,400, and the incorporators are S. Duncan, A. E. Walker and W. A. Fling.

AURORA, IND.—The Southern Indiana Telephone Company, of Aurora, has been incorporated with a capital stock of $10,000. The directors of the new company are Ernest W. Swarthout, Frank B. Shutts and William H. O'Brien.

THOR, IA.—The business men of Thor, Ia., are engaged in the formation of an Independent telephone company. Nearly $2,000 has already been subscribed, and all indications point to the installation of a system at Thor at an early date.

MILBURN, KY.—The Milburn Independent Telephone Company of Carlisle County has been incorporated with a capital stock of $1,000.

COLUMBIA, ME.—George Grant, of Ellsworth, is interested in the formation of The Farmers' Telephone Company, which is to build lines to connect Columbia, Columbia Falls, Addison and Huntington.

BYRON, MINN.—Articles of incorporation have been filed by the Cass County Mutual Telephone Company, Byron. The capital stock of the company is $10,000. Among the incorporators are the following: F. W. Deline, J. O. Jesme, Leader; F. H. Clayton, Esterly.

ROBBINS, MINN.—The Riverside Co-operative Telephone Company, with its central office at Robbins, has been organized. The company has constructed lines to Teien and is considering the advisability of making connections with the Drayton Telephone Company.

ROBBINS, MINN.—The Teien Farmers' Telephone Company has been organized and is now engaged in the construction of its system. The central office of the company is located at Robbins, Minn.

APPLETON CITY, MO.—The Appleton City & Rockville Telephone Company, of Appleton City, has been incorporated with a capital stock of $25,000. The incorporators are E. A. Hook, J. S. Painter, W. I. Marriott, R. C. Mendenhal and others.

ALLIANCE, NEB.—The Ranch Telephone Company, of Alliance, has filed articles of incorporation. It is incorporated by William M. Hill, W. N. Campbell and others, and has a capital stock of $10,000.

KELLYS ISLAND, O.—The Kelleys Island Telephone and Electric Company, Kelleys Island, Erie County, O., has been incorporated with a capital stock of $10,000. The incorperators are Norman C. Upp and others.

PONCA, OKLA.—An Independent telephone company, known as the Home Telephone Company, has been incorporated to compete with the Pioneer Telephone Company (Bell) in Ponca, Okla. The company has a capital stock of $100,000. In addition to establishing an exchange at Ponca, it is the intention of the incorporators to arrange for long distance connections with Oklahoma City and Guthrie on the south, and Arkansas City and Winfield on the north. The organizers of the company are R. E. Morrison, G. L. Miller, M. Cunyan, J. J. McGraw, George Brett and W. L. Barnum.

GREENBURR, PA.—The Sugar Valley Telephone Company has been incorporated to operate lines in Clinton and Centre counties, with headquarters at Greenburr. The directors of the company are Harry G. Shearer, Lock Haven; David Tyson and H. A. Lamey, Greenburr; Harry Welshons, Russel Schreck and Byron Exkel, Booneville, and Jerry I. Shaffer, Tylersville.

HERRICKVILLE, PA.—A new telephone company to be known as the Herrickville Accommodation Line has been organized at Herrickville, and work on the company's lines will be commenced at once.

WAYNE, PA.—Articles of incorporation have been filed by the Wayne Telephone Company, of Wayne, Pa. The capital is fixed at $3,000, and the following directors have been elected: L. W. Nelson, Leon Mitchell and J. W. Ridd.

HARTFORD, S. D.—The Sunrose Telephone Company, of Hartford, Minnehaha County, has been incorporated with a capital stock of $5,000. Among the incorporators are J. P. Frederickson, William J. Forney and Clarence Forman, all of Hartford.

HOWARD, S. D.—The Farmers' Co-operative Telephone Company has been organized to cover the northeast part of Miner County. Thirty miles of wire is being strung.

BRENHAM, TEX.—The Muellersville-Brenham Telephone Company, of Brenham, has been incorporated with a capital stock of $600. The incorporators are W. F. Mueller, of Muellersville; O. B. Lehman, Otto Seander and Otto Loesch, all of Brenham.

HILLSBORO, TEX.—The Hillsboro Telephone Company, to do business in the counties of Hill, Navarro, Ellis, Johnson, Tarrant, Dallas, Kaufman, Somervell, Hood and Parker, has been incorporated with a capital stock of $200,000. The incorporators are N. H. Davenport, R. Armstrong, William Helfenstein and others.

RIDGEFIELD, WASH.—Articles of incorporation have been filed by the Ridgefield and Vancouver Farmers' Union Telephone Company. The capital stock of the company is placed at $1,700. Among the incorporators are George Page and F. A. Dodge.

BELMONT, WIS.—The Belmont and Pleasant View Telephone Company has been incorporated with a capital stock of $10,000. E. T. Hinkins is president, and John Hillery secretary.

DIDSBURY, ALB., CANADA.—The residents of Didsbury, Alberta, Canada, have decided to combine for the purpose of erecting a telephone system in that village. G. B. Sexsmith, overseer, has been instructed to obtain prices, plans, etc.

HARVEY STATION, N. B., CAN.—The Harvey Telephone Company has been organized. Walter Purce, of Coburn, is secretary. The company will build a line eleven miles long from Harvey Station to York Mills, under the direction of James Hunter, St. John.

HAVANA, CUBA.—A prominent London banking house announces the purchase of the controlling interest in the Cuban Telephone and Telegraph Company and the Red Telefonica Company, of Havana. The companies are to be re-organized under the title of the Havana Telephone Company. The new company, which is to be controlled by a board of English directors, headed by Lord Elcho, expects to install a new plant.

FRANCHISES.

LITTLETON, COLO.—The Northwestern Telephone Company, of Longmont, Colo., recently organized, has applied for a franchise at Littleton, and expects soon to apply in other northern Colorado towns.

LOWELL, MASS.—The Merrimac River Valley Independent Telephone Company has been granted permission to construct a telephone system in Lowell.

ALLIANCE, O.—The Sandy Valley Telephone and Electric Company, recently organized, has secured franchises at Malvern, Waynesburg, Magnolia and Sparta. The work of building the lines and exchanges will be started very soon.

FINDLAY, O.—The Farmers Mutual Telephone Company has applied for a franchise to construct telephone lines and establish an exchange at Findlay.

MELITA, MAN., CANADA.—The Melita-Arthur Independent Telephone Company has applied for the privilege of constructing a telephone line in Brenda, Man.

FINANCIAL.

COLLINSVILLE, CONN.—The Columbia Telephone Company has paid its seventh quarterly dividend of 1¼ per cent.

MINIER, ILL.—The Minier Mutual Telephone Company, Minier, has increased its capital stock from $15,000 to $25,000.

BRUNSWICK, O.—The capital stock of the Brunswick Telephone Company of Brunswick has been increased from $5,000 to $20,000.

GERMANTOWN, O.—The stockholders of the Germantown Independent Telephone Company are to hold a meeting shortly to consider the advisability of increasing the capital stock to $20,000.

BELMONT, W. VA.—The Belmont Telephone Company has declared its semi-annual dividend of 3 per cent. The company is making many extensions in its lines.

COMBINATIONS.

MONMOUTH, ILL.—The Henderson County Farmers' Telephone lines and the Stronghurst exchange have been acquired by J. L. Galloway, of Monmouth.

TROY, N. Y.—Negotiations have practically been completed by the Commercial Telephone Company for the control of the properties of the Rensselaer Telephone and Telegraph Company, the Saratoga Telephone and Telegraph Company and the New Union Telephone Company.

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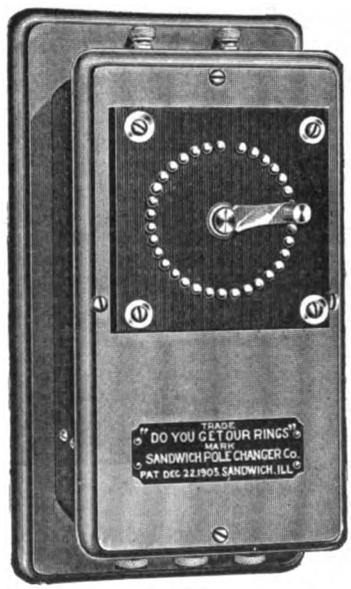

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Here are the facts in the case: By connecting our duplexers to the two existing metallic circuits a new one is formed which utilizes each pair of wires as one side of an independent metallic line.

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THE WEEK'S MESSAGES

ELECTIONS.

KANKAKEE, ILL.—The Eastern Illinois Independent Telephone Company has elected the following directors: Thomas Legris, Jay A. Sherwood, A. J. Vernier, Thomas A. Kerr, Louis E. Beckman, William Fraser, I. W. Gotschall, Charles McLaughlin, William H. Radcke, Joseph R. Speicher and Charles N. King.

MONMOUTH, ILL.—The Monmouth Independent Telephone Company has elected the following officers: President, C. C. McClung; vice president, J. E. Lanphere; treasurer, H. B. Smith; secretary, W. J. McQuiston.

NOBLESVILLE, IND.—The Home Telephone Company has elected the following officers and directors: President, Thomas Griffin; secretary and treasurer, Elihu Hawkins; directors, E. M. Hare, Thomas Griffin, A. D. Booth, Harry McGrath and Elihu Hawkins.

MARQUETTE, MICH.—The Menominee Range Telephone Company has elected the following officers: E. F. Brown, president; Samuel Perkins, vice president; R. C. Browning, secretary; William Sundstrom, treasurer; E. A. Croll, manager.

PERSONALS.

R. A. McCURDY, manager of the Cumberland Telephone and Telegraph Company's exchange at Fulton, Ky., has resigned to take charge of the plant of the Home Telephone Company at Mayfield.

JOHN C. SKUSE has been appointed manager of the New Ulm Telephone Company at New Ulm, Minn.

EDWARD WELLINGHAM who has been with the Cumberland Telephone and Telegraph Company at Fulton, Ky., has been made manager of the company's exchange at Bardwell.

MISCELLANEOUS.

REGINA, SASK., CANADA.—A convention of municipalities will meet here next month and a resolution will be passed endorsing plans for municipal telephone plants. P. McAra, Regina, will probably act as chairman.

CRYSTAL CITY, MAN., CANADA.—The town council has granted the Louise Telephone Company $200 toward building a long distance line from Clearwater to Pilot Mound.

New Construction in the Field

LAKE VILLAGE, ARK.—The Valley Telephone Company is building a line to Eudora from Lake Village. It is also installing a new exchange at Eudora; connections will be made from Scaife, Sterling, Readland and Cracraft with the Eudora exchange.

MOULTRIE, GA.—The Moultrie Telephone Company expects to install a new exchange at Moultrie to accommodate its increased business at that point.

MALAD CITY, IDAHO.—The Independent Telephone Company, of Salt Lake City, Utah, which is building lines to Eden and Huntsville, will shortly construct lines to Malad City, Idaho.

ST. ANTHONY, IDAHO.—Among the many improvements planned by the Fremont Telephone Company is a line from St. Anthony to Ashton, Squirrel, points in Teton Basin to Victor, connecting with the Independent line in Jackson's Hole. The company also intends to construct a line to Idaho Falls.

NEZ PERCE, IDAHO.—The Nez Perce Co-Operative Telephone Company has under construction a line to Grangeville.

WEISER, IDAHO.—The lines of the Mutual Telephone Company are being extended in Weiser.

CAIRO, ILL.—The Cairo Telephone Company is improving and extending its system.

WATSEKA, ILL.—The Home Telephone Company expects to extend its lines into Belmont township.

CLINTON, IND.—The Indiana Telephone and Telegraph Company, formerly known as the Horney Telephone Company, will spend $34,000 in establishing a new exchange at Clinton.

COLUMBIA CITY, IND.—A large sum of money will be spent by the Farmers' Mutual Telephone Company in the completion of its contemplated improvements and extensions.

ELIZABETHTOWN, IND.—It is the intention of the Citizens' Telephone Company of Columbus to entirely rebuild its exchange at Elizabethtown. The installation of a new exchange at that point will give a very much improved service to the citizens of the town.

ELWOOD, IND.—The D. & M. Telephone Company, which already maintains extensive lines north, south and east of Elwood, contemplates the construction of lines into Tipton County, with Tipton as the objective point.

GRAMMER, IND.—The exchange of the Citizens' Telephone Company at Grammer is to be entirely rebuilt. A new switchboard will be installed and the size of the plant materially increased.

ARDMORE, I. T.—It was decided at a recent meeting of the Merchants and Planters' Telephone Company, which operates lines in Brock, Cheek, Oswalt, Simon, Rock, Orr, Grady and a number of other towns, to further extend its lines.

COTTONWOOD FALLS, KAS.—The Chase County Telephone Company is rebuilding and enlarging its local exchanges both at Cottonwood Falls and Strong City.

PADUCAH, KY.—The Home Telephone Company is to spend $175,000 in improvements in Paducah. New switchboards will be installed, new lines built and considerable underground work done.

PIKEVILLE, KY.—The Eastern Kentucky Home Telephone Company, whose exchange at Pikeville is nearing completion, expects to at once commence the construction of toll lines to Elkhorn and Marrowbone, connecting all important points in the coal fields.

ALEXANDRIA, LA.—Under the direction of Lieutenant W. B. O'Donald, U. S. Signal Corps at New Orleans, work on the construction of a telephone line from Alexandria to Camp Stafford has been commenced.

MOUNT VERNON, ME.—The Maine Telephone Company, which recently purchased the Crosby line running through Readfield and Mount Vernon, is engaged in repairing and extending its lines in Mount Vernon. The company will also build a line to Belgrade from Mount Vernon.

FLINT, MICH.—The Union Telephone Company's lines are being extended in Flint.

ALBERT LEA, MINN.—The Tri-State Telephone Company is to install an exchange at Albert Lea. The company has also just completed a line to Manchester.

LONG LAKE, MINN.—The lines of the Hennepin Telephone Company are to be extended north and west of the village to the region of Independence Lake. Construction work will be continued until the system of the company has reached a state of completion.

CORNING, N. Y.—The Consolidated Telephone Company contemplates the expenditure of $30,000 in conduit work at Corning.

ROLETTE, N. D.—The Northern Telephone Company is building a line along the Soo from Rolette to Kenmare. An exchange is also to be established at Lansford.

STARKWEATHER, N. D.—A. B. Kerlin expects to build a telephone line from Starkweather northeast. He will also build a line to Newville.

VELVA, N. D.—An Independent telephone exchange is to be established at Velva.

CALDWELL, O.—The Noble County Farmers Telephone Company is at work on the construction of its telephone system and exchanges at Caldwell. Excellent service is promised by the company when the work has been finished.

COLLINSWOOD, O.—The Cuyahoga Telephone Company, of Cleveland, has been granted a franchise to place some of its wires underground in Collinswood.

COSHOCTON, O.—The Citizens' Telephone Company, which is to put in a new line from Coshocton to Fresno direct, is also to build a line from Chili to Coshocton.

HAMILTON, O.—The Home Telephone Company is improving its system about New Haven and New Baltimore, and also contemplates the erection of lines to Miami and Harrison.

KENTON, O.—The Kenton Telephone Company has constructed a line to Jumbo, a distance of about ten miles.

WEST UNION, O.—The Independent Telephone Company of West Union is to build twenty-five miles of new lines.

DALLES, ORE.—The Mutual Telephone Company is rebuilding its system at Dalles.

KLAMATH FALLS, ORE.—It is the intention of the Midway Telephone and Telegraph Company, of which H. V. Gates of Hillsboro is president, to build a line from Klamath Falls to Lakeview. The company also expects to build lines from the Falls to Merrill, a distance of twenty-four miles.

PAISLEY, ORE.—The Farmers Mutual Telephone Company is to build a line from Paisley to Lakeview, and also has under contemplation a line from Bunting to Bly.

CONFLUENCE, PA.—The Garrett County Telephone Company is extending its system at Confluence.

MEMPHIS, TENN.—The Memphis Telephone Company is to materially expand and improve its system. Additional equipment will be added to its present exchange, and a branch exchange will be established in the eastern part of Memphis.

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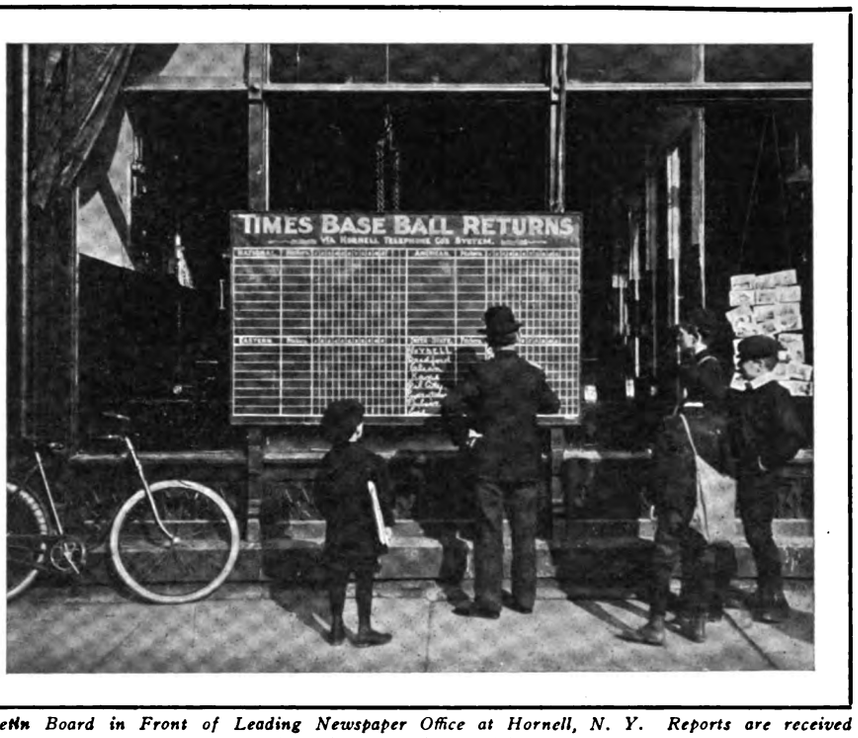
Baseball Reports by Telephone

By Wm. A. Wadsworth.

THE service by which the Inter-Ocean Telephone and Telegraph Company, of Buffalo, N. Y., gives to its subscribers reports of baseball scores made by teams in the various leagues is believed to be the first example of successful competition with the ticker system of the Western Union Telegraph Company in the furnishing of this class of news.

This company operates its system of toll lines in a territory where the greatest interest is taken in the great national game by nearly all the people. It makes no difference what size the town may be, the residents want the returns, and what is more, they are anxious to have them right through the game. Even in the little towns of a few hundreds of people every one wants to get as good baseball reports as are furnished to the thousands of people who crowd Park Row, in New York City, during the hour when the final scores are being posted on the huge bulletin boards of the great Metropolitan newspapers.



Bulletin Board in Front of Leading Newspaper Office at Hornell, N. Y. Reports are received by telephone without delay.

This is the kind of information that can be furnished through the efficient use of the telephone lines better than in any other way, and it is because this fact was realized by its officials that the Inter-Ocean Company is able to give to its subscribers a service which is at once immensely popular among the people and a source of profit to the telephone company. Special connections for the giving of baseball news are now being regularly made to over 150 subscribers and the returns are also given to every town with more than three hundred inhabitants which is located in Inter-Ocean territory. This means, among other things, that within a few minutes of the time when a run is made by a player who may, perhaps, be in a game in a city many miles away, the fact is made known to the interested groups of enthusiasts who await the report in little villages and hamlets where the returns have never before been available either by telephone, telegraph or railway. So eager are the dwellers in the more remote settlements to be thus brought in touch with this sport, which is to them by far the best known and most popular of any form of athletic game, that in some places the people have joined together to secure the service, each person contributing his little share to make up the sum required to pay the telephone rental. As an instance of this may be mentioned the town of Cherry Creek, with a population of about 300.

So novel is the handling of news in this manner to the people whom it reaches that it has awakened a great deal of enthusiasm. Summer resorts have found the hour when the returns come in to be the most interesting in the day. Even the daily mail has had to take second place, and the pages of the newspapers devoted to this sport, when they arrive from the cities, are an old story to the people who have learned the substance of what they contain hours before the railroads can transport them to the towns more remote from the places where they are published. By the newspapers in the places outside of the largest cities, however, it is as much appreciated as by the general public. The sporting editors of these papers are supplied with complete returns of the National, American, and Eastern Leagues, as well as of the league in which the local team plays. The editors of these papers, as well as many of the prominent people in the towns which are reached, praise the service in the most hearty terms. It is considered to be a thing which satisfies a want which the people have felt for a considerable time, the fulfillment of which has been made possible by the exceptionally large development of the Independent systems in the remotest places of Western New York.

The company at the present time gives this service to a limited number of patrons. In places where the population is 500 or less one subscriber is secured; in towns having from 500 to 1,000 people two subscribers are connected; in towns having a popula-

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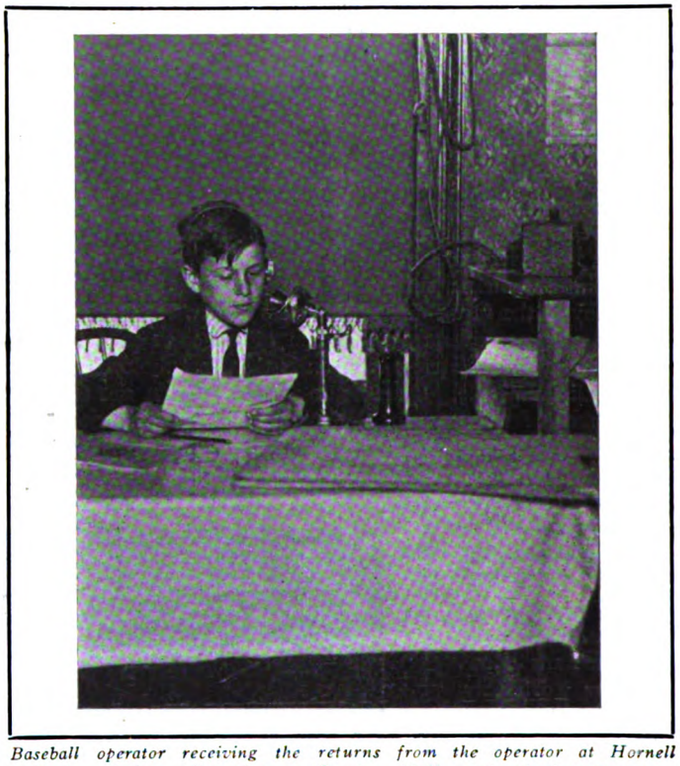
tion of 1,000 to 2,000 it is furnished to three subscribers, while in places where the population is above 2,000 the service is furnished to as many people as is convenient, but is only given to

Boy at Hornell Baseball Park sending result of the inning to the operator at the office of the Hornell Telephone Company.

one person on any single street. In Jamestown, N. Y., for instance, there are ten subscribers for the baseball reports. This means an additional revenue to the company, under the established system of charges of $22.00 weekly. The actual cost of sending the returns to this place is only $12.00 per week. This includes the cost for the use of the toll lines at the regular rate.

The giving of this service has proved to be an important measure for giving the company an advantage over its Bell competitor, which up to the present time has found it impossible to give the returns in a satisfactory manner. The attempts of the local managers to meet the conditions are most amusing. They are in the habit of scouting around in the different towns in an attempt to obtain the returns from the bulletins of the Independent company from blackboards and subscribers. When they get a few scores they rush back to the central office and loudly proclaim that they have the returns and will give them free of charge to anyone who cares for them. Of course this sort of thing does the Independent company more good than harm. It helps to advertise.

As a means of simplifying the handling of returns, and insuring accuracy, they are first received at Buffalo, where they are put in proper shape for transmission. From the office there they are sent out by telegraph, over simplexed telephone circuits, to what are called the four sending stations, namely, Gonanda, Rush, Geneva and Hornell, N. Y. From each of these sending



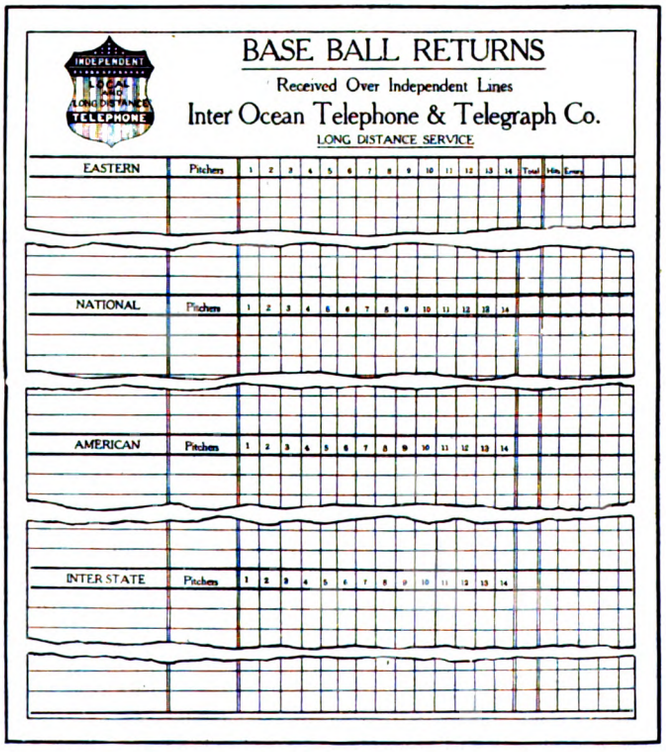
Baseball operator receiving the returns from the operator at Hornell Park, and forwarding them to Corning, N. Y., and suburban towns, 42 miles away.

stations the reports are transmitted by telephone to the exchanges in the smaller towns. The operators who receive them immediately pass them on to the subscribers. It will be seen that in the ordinary course of the service there are very few operations to be performed, and in fact the work has been so systematized that from the time the returns are received at Buffalo until they are sent to the most remote subscriber who receives the service, 116 miles away, requiring the passing of reports by four operators, the time consumed is only four minutes. In order to secure such results as this it is necessary that the returns should be handled only by careful and competent operators. The success of this service is due, in a large part, to the prompt work of the employees who handle it, and although the people connected with the rival company keep close watch for errors, none have as yet been pointed out.

The Inter-Ocean company co-operates with the Union Telephone company, of Erie, Pa., in the giving of these returns, each company reporting the results of games played in its territory to the other. Some time ago the question of obtaining the exclusive privilege of reporting by telephone the games of the Inter-State Baseball League came up before its Board of Managers, and the associated Independent companies defeated their rivals. This meant that the Bell company could not have an instrument on the grounds at all, and their efforts to overcome this obstacle created considerable amusement in the territory.

They made attempts to give a telephone service from instruments located just outside the grounds, as, for instance, they do at Hornell, where the reports are sent out over the Independent

(Continued on page 59.)



Score cards in this form are furnished to all subscribers for the baseball service of the Inter-Ocean Telephone and Telegraph Company.

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A Method of Testing for Short Circuited Turns in Magnet Spools

By C. D. Enochs.

THE problem of determining whether or not magnet spools for use in various pieces of apparatus have short circuited turns is one that has to be met by all of the manufacturing companies desirous of upholding a high standard in their different classes of apparatus. The method of testing the ohmic resistance of the spool does not necessarily, nor even probably determine whether or not any turns are short circuited. The extremely low voltage between the two adjacent points in a coil of wire will prevent the current from passing over a contact which is in truth a metallic contact for alternating currents used in telephone work. To determine whether or not a coil has any of its turns short circuited it is necessary to make a special test for that purpose alone.

In an induction coil the test is very simple as it can be made before the iron core is placed inside of the tube upon which the wire is wound. This may be done in several ways, one of which employs the direct induction balance test, in which the spool to be tested is placed in one side of an induction bridge and tested against a spool of known impedance. This is an accurate test, but does not give a very close idea as to how many turns are short circuited in the various spools tested.

In this direct induction balance the theory involved is closely analogous to that of the Wheatstone bridge. In the case of a Wheatstone bridge of the slide wire type as shown in sketch No. 1, the balance is secured when the fall of potential from A to B is equal to that from A to B′; that is, when the fall of potential from the points A to B and from A to B′ is the same, there will be no difference in potential of the points B and B′. Under these conditions no current will flow through the galvanometer G.

In this style of induction balance as used for testing spools the resistance R1, Fig. 2, is in the form of an impedance coil of the same impedance as would be the coil to be tested, were the coil free from short circuited turns and wound with the full number of turns specified. The slide wire represents the other two portions of the bridge, being divided by the movable contact C. Instead of the direct current battery used with a Wheatstone bridge, a source of alternating current of high frequency is

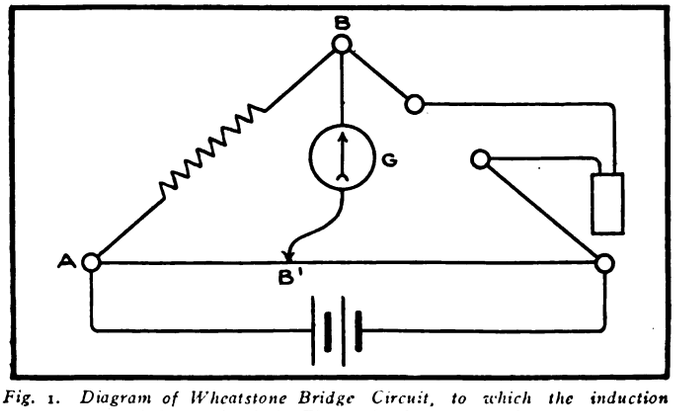

Fig. 1. Diagram of Wheatstone Bridge Circuit, to which the induction balance circuit in Fig. 2 closely corresponds.

applied at the points corresponding to where the battery is connected in the Wheatstone bridge. If there is no difference in potential in the points B and C it is evident no current will flow and no tone will be heard in the receiver, which in this test replaces the galvanometer used in the Wheatstone bridge.

The slide wire has practically no inductance so that the only resistance it offers to the alternating current is the ohmic resistance of the wire itself. The coils R1 and the coil to be tested will have both ohmic resistance and inductance. If the same size wire is used in both spools and the same number of turns used in both cases, the ohmic resistance of the two coils will be identical. If the number of turns is the same in the two coils and the cores are free from iron, and no turns are short circuited, the inductance of the two coils will be identical. Under these conditions the impedance of the coil R1 will be exactly equal to the impedance of the coil R2, hence, the potential from the point A to B will equal the potential of the point B to D. When contact C is in the center of the slide wire, it is evident that the potential from A to C will equal the potential from C to D. It is then evident that the potential is the same at points B and C, and no current flows through the receiver.

On the other hand, if there are short circuited turns in the spool R2 we have two effects introduced to disturb the relation

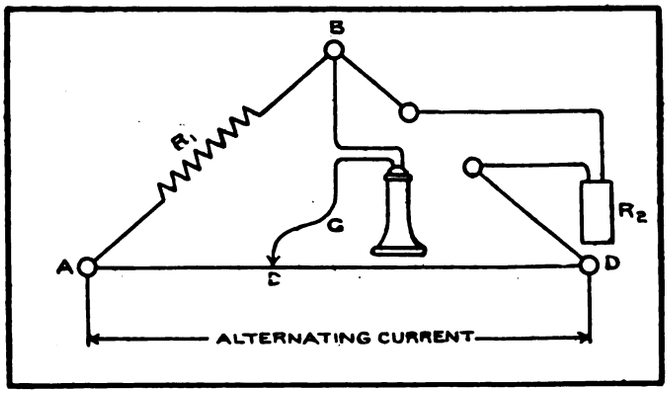

Fig 2. Connections for testing spools by an induction balance.

of the bridge. First, the contact may or may not be sufficient to change the ohmic resistance of the winding of R2. Second, the fact that a portion of the turns are short circuited means that the coil R2 has that number of turns less than the coil R1 in producing the inductance of the coil. Again, the short circuited turns of this coil will act as a secondary and alternating current will be induced from the other turns on the coil to the short circuited turns, setting up a comparatively heavy flow of current through these coils. As this current induced is in the opposite direction to the primary alternating current, the effect is to diminish the inductance of the coil still further.

If the inductance, and consequently the impedance, of this coil is less than that of the standard coil, the result will be that there will be a difference of potential between the points B and C and a certain amount of current will flow through the receiver, thus causing the tone noticed.

The result in practice is that even if a comparatively small number of turns is short circuited the fact can be detected by this method, whereas, with the ohmic resistance measurement only, this same number of turns could not be noticed.

Another method, which has been employed by a prominent manufacturing company, is to use an induction balance and to pass the coil to be tested near one of the induction coils in the bridge circuit.

This method involves the use of what is known as the Hughes Induction Balance. The coils P1 and P2 (Fig. 3) are in circuit with the source of alternating current. The coils S1 and S2 must contain exactly the same number of turns and be identical throughout. These coils are connected in series with a telephone receiver. It is evident that there will be mutual inductance between coil P1 and S1 and also between coils P2 and S2. The induced actions in coils S1 and S2 are opposed, hence, with a perfect balance no tone is heard in the receiver. If a coil having short circuited turns is passed over or between coils S1 and P1 it is evident that a current will be induced in the short circuited turns by magnetic influence from P1. This action will rob the

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coil S1 of its normal proportion of induced voltage and the induced voltage of S2 will predominate, forcing a certain amount of current through the telephone receiver. If, on the other hand, the coil passed over the balance is free from short circuited turns, there is no circuit through which an induced action may be set up by the magnetic field surrounding P1. If the wire is very coarse there will be a tendency to set up eddy currents in the wire itself, but in coils ordinarily used in telephone practice, this defect is not noticed. Coils wound with as heavy wire as No. 18 may be tested in this fashion.

Either one of the above methods will fail absolutely if either of the coils to be tested contains an iron core.

In the case of test No. 1 the difference in quality of the iron, which cannot be avoided, in the standard coil and the one under test, will greatly unbalance the bridge and it will be found diffi-

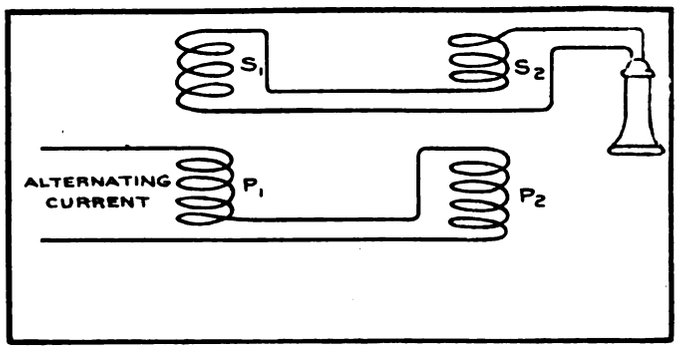

Fig. 3. Circuit of Hughes Induction Balance.

cult to discover two coils that will balance, although they may both be absolutely free of short circuited turns. In case No. 2 the passing of the coil having an iron core over the balance bridge will cause a loud tone in the receiver. This is due essentially to one of two causes. First, the introduction of the iron in the magnetic field will greatly increase the inductance of the coil near which it is placed, as the magnetic reluctance of its circuit is greatly reduced by the introduction of the iron. There will be an effect due to the eddy currents set up in the mass of iron and this tends to reduce the impedance of the coil. However, the effect of increasing the impedance by the lowering of the magnetic reluctance is so much greater than the opposite effect, due to the eddy currents, that the inductance of the coil near which the iron core is passed will be greatly raised, and hence its inductive effect upon the coil opposite will be greatly augmented on account of the increased number of magnetic lines.

The following method was devised about three years ago, and has since then been in constant use in the shops of the same manufactory above referred to, both at Chicago and New York. Ringer coils and generator armatures are tested by it, and in fact it is used in tests of almost all of the coils entering into various pieces of apparatus which are tested after being wound on their iron cores.

This method is practically built upon the first method described, and its development was merely the result of noticing some of the peculiarities in the practical operation with the first method. In this, we merely take advantage of a peculiar action noted in the first test and by means of this peculiar action are enabled to carry our test to such a degree that the iron in the core will not affect the operation.

The circuit is as shown in Fig. 4. There is a balanced bridge as shown in the sketch, and also a switch by means of which one of the inductance coils may be cut out of the circuit and the coil under test cut in. With the switch in position A the bridge is balanced and there is no tone in the receiver. With the switch in position B, in 99 cases of of 100 the bridge will be unbalanced on account of the difference in quality of iron in the coil N and the standard coil C. So far the method is the same as in the induction balance. When the testing operator throws the switch over to position B and finds, as is usually the case, a tone in the receiver, contact D is moved along the slide wire E.

If the unbalancing of the bridge were caused merely by the difference in the magnetic quality in the iron core, a point will be found at X, for example, at which no tone will be heard in the receiver. That is, by shifting the slide wire, the potential fall across one coil would bear to the potential fall across the second coil the same relation as the potential fall across the two parts of the slide wire bridge. If, however, the coil had short circuited turns, whether or not there is any difference in the magnetic quality of the iron core, it will be impossible to find a point along the slide wire E at which there will be no tone in the receiver.

This is due, in the first instance, to the fact that the difference in the quality of iron merely changes the inductance of one side of the bridge and a new balancing point can be found by moving the contact D.

If, however, the balance is thrown out by short circuited turns on the coil, there is set up a sort of secondary action in the coil which throws a new phase relation into the circuit and there is nothing on the other side of the bridge which can be made to offset this.

In making this test, it will be found not only that a balance cannot be obtained with coils having short circuited turns, but that the tone in the receiver is of a different quality from that noted when the balance is thrown out by a difference in the inductance only.

If the balance were disturbed merely by the reduced impedance of the coil under test, it would be possible to move the slide wire contact and find a point where the difference of potential HJ would equal the difference of potential between H and D, when there would be no current flowing through the receiver. By test we find that when there are short circuited turns no such point can be found. It is evident then that this secondary action which is set up in the coil by the short circuited turns is something more than a mere reduction of its impedance. It would seem probable that this is the result of a retardation of the phase of the alternating current of the path JL. The inducing of the current into the short circuited turns by the action of the current in the perfect turns of the spool will, of course, cause a back pressure upon the alternating current in the clear part of the winding. The tendency of this is to make the current lag behind its normal relation with the impressed voltage.

This would seem to explain the action in the receiver, for under such conditions the phases of the current flowing over the

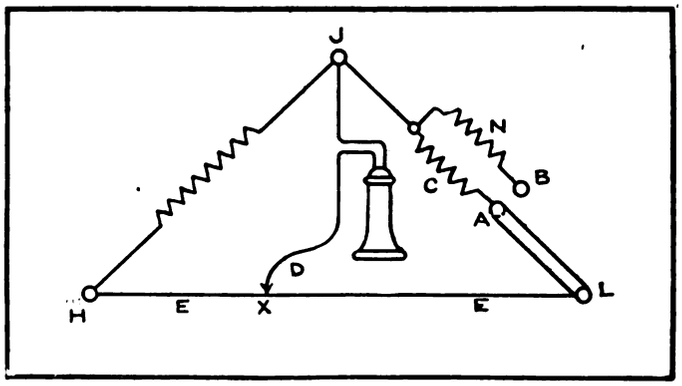

Fig. 4. Modified bridge circuit devised for testing for short-circuited turns in magnet spools.

two paths of the bridge would be different and, of course, could never be made to exactly neutralize, no matter where the contact point might be shifted. This would also account for the difference in quality noted in the tone in the receiver.

After a person has used this method of testing for some time, it will be found possible to tell whether or not a coil is short circuited by the quality of tone, without moving the contact over the slide wire. Oftentimes the difference in quality of iron will be so great as to throw the balance point to the extreme end of one side of the slide wire or the other, but if the coil is clear there will always be a point at which a balance can be secured.

A test of this kind made on spools of various sorts will show

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that a great proportion of the spools used in commercial service have a greater or less number of short circuited turns. For practical application in factory use it is necessary to determine by actual experiment how many turns may be short circuited in a coil without injuring the operation of the piece of apparatus in which the spool is used. After such a determination has been made, it is easy to arrange a coil, G (Fig. 5), which has purposely had that number of turns short circuited. This can be thrown into the bridge by moving the switch to the point C.

In practical testing, then, the method is as follows: The coil to be tested is placed in position as shown. The operator listens first to the standard coils against each other with the switch in position A. The switch is then moved to position B and the quality of the tone noted. If necessary, the operator moves the slide and determines that there is no balance point. It is then known that the coil has short circuited turns. The next step is to see whether or not there are enough turns short circuited to warrant the rejection of the spool. This is done by throwing the switch to position C which cuts the standard coil in against the standard short circuited spool. If the tone in this case is louder than in the case of the spool under test, it is known that the spool may be safely passed, as the number of turns short circuited is less than what has been determined would injure the piece of apparatus for which it is used.

It will be noted that if nothing further were provided, the standard short circuited spool would be balanced against the standard spool with the slide at whatever position it was left when the test coil was used. In order to facilitate matters, the last position of the switch, C, is made to short circuit the slide wire entirely, and the short circuited standard spool is balanced against the standard inductance spool with the coils M and N serving as the non-inductive parts of the bridge. The standard short circuited spool, of course, must be selected with the same quality of iron as the standard inductance spool so that the balance would be perfect under these conditions, were it not for the short circuited turns.

After a little study into the operation of this circuit, it will be seen that it is not so complex as appears at first glance and after it is once set up the test for short circuited spools can be made a great deal simpler than can the test for ohmic resistance. To the best knowledge of the writer, it was determined by the company to abandon the ohmic resistance test on all spools in which the number of turns, rather than ohmic resistance, was the important factor. The turns were, of course, checked on the winding machine. The ohmic resistance was not measured at any time during the manufacture and the test as outlined above was relied upon to give the final check on the number of turns wound upon the spool as well as for the determination of the number of such turns that might be short circuited.

In making up a test for short circuited turns, it is advisable, at least for parties not having access to laboratories, to use the third method. In fact, this method is by far the most satisfactory throughout, as it allows the test with iron core spools. The second test described, that with the Hughes Induction Balance is the most difficult of all to set up.

The balancing in opposition of two induced alternating currents is an extremely hard proposition to undertake without the aid of a well equipped laboratory. The ohmic resistance and inductance as well as the mutual induction between the coils and the self-inductance of the coils must all be exactly the same, otherwise the extremely sensitive receiver will pick up the current resulting from the unbalanced voltages. On account of the extreme difficulty in making this apparatus, it is hardly advisable for operating companies to attempt such a test, and as the third test is the more accurate, there is no reason for going to the expense necessary.

Test No. 1 is the simplest of the three to set up, but does not give as satisfactory results as test No. 3. In making apparatus for this all that is necessary is to secure two spools with exactly the same number of turns, the same quality of iron and without short circuits in the winding. This can easily be done in commercial products by the process of elimination, or if facilities for winding are at hand, the standard coil may be wound with double silk magnet wire. This will not influence the results of the test and will insure a coil free from short circuited turns.

For making the third test, it is necessary to obtain three spools of the same quality throughout; identical number of turns, equal ohmic resistance, although the ohmic resistance is a small matter, the same quality of iron core and all absolutely free from short circuited turns. This may also be accomplished by the process of elimination in testing or by the use of spools wound with double silk wire.

For the coil G it is necessary to observe the same precautions as in the other coil and in addition it is necessary to bring out a loop of the winding at a certain determined point in the winding so that by connecting this loop with one end of the spool one can short circuit at will a certain number of turns in this spool. For the purpose of testing ringer spools ranging from 500 to 1,250 ohms, the spools used by the writer were ordinary ringer spools corresponding to the ones under test. A coil wound with double silk covered wire was taken as a first standard and by comparison a number of spools were obtained wound with single silk wire in which no coils were short circuited, and

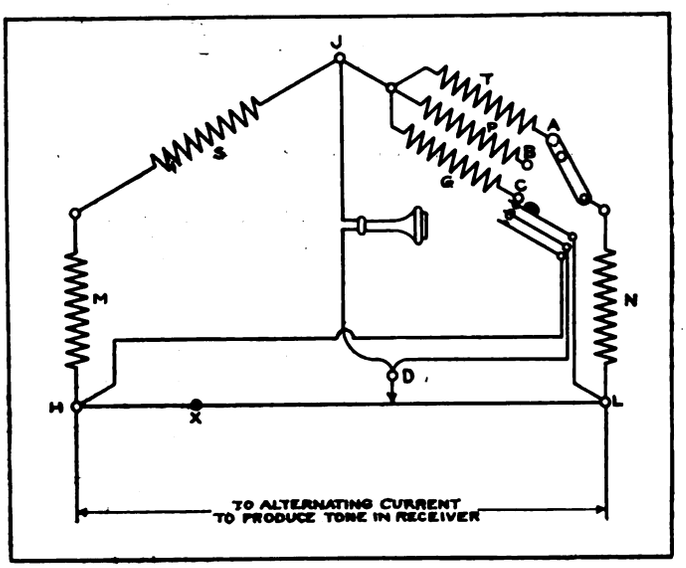

Fig. 5. Circuit for making rapid practical tests for short-circuited turns in magnet spools.

in which the quality of the iron was identical. A certain number of short circuited turns was found by experiment to be not injurious to the action of a telephone ringer. That number of coils was purposely short circuited in the spool G. The coils M and N were made with German silver wire, No. 30 gauge, wound non-inductively upon a wooden spool, and measuring five ohms. The slide wire was made from No. 30 bare German silver wire and measured approximately five ohms. The sliding contact D may be obtained in any manner, depending upon how well the test set is to be worked out. It may take the form of a knife blade which is moved along the slide, or it may be an elaborate arrangement of sliding contact with a platinum point. That part of the test set is immaterial. The main precautions to be observed are to get the coils S, P and T accurate, also to get the resistance of coils M and N identical.

Such a test as designated here as No. 3, sketch 5, will be found almost invaluable not only for the laboratories of manufacturing companies, but also for their shop testing departments. It will probably be found of great value to at least the larger operating companies. Coils which are liable to burn out from lightning could be tested by this method and often a poor acting relay or ringer will be found to be non-operative on account of short circuited turns. It will be found that in a great many cases the ringer will measure full ohmage and the trouble man will be unable to see any reason for the improper action of the apparatus. With a test such as described the fact that turns in

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the spool were short circuited would be immediately revealed and the spool would be at once rejected without further investigation.

If desired, this test may be carried even further as, for example, in testing a completed ringer with the armature and magnet in place. This method will test a complete ringer as easily as the individual spool, but under such circumstances, it would be found necessary to make a bridge having the slide wire a larger proportion of the total non-inductive resistance. The reason for this is apparent as the impedance of various ringers will differ greatly on account of the distance of the armature from the core and also on account of the different strength of magnets. For making a test of completed ringers, it is well to use non-inductive spools of about two ohms resistance and a slide wire of at least ten ohms resistance. With such an arrangement, it is possible to always find a balance point on the slide wire even though there is a great variation in the impedance of the ringers.

With the arrangement as shown in the sketch for ordinary spool testing, the balance point for a portion of the ringers which would be clear of short circuited turns, would be found on one of the non-inductive spools M or N. It would, of course, be impossible to reach this with the slide contact, and the spool could not be tested on that account. On the other hand, if the slide wire is made of a greater proportionate part of the non-inductive resistance, it will be found easy to locate the balancing point always on the slide wire.

Telephone Competition and Monopoly*

By F. Dagger.

I NOW turn to the subject of competition in telephones, and would first refer you to Stockholm, Sweden, where the International Bell Telephone Company established an exchange in 1880. Three years later a local Independent company commenced operations and in twelve months had 2,300 subscribers against 900 of the "Bell." The government subsequently deciding to monopolize the long distance lines, purchased all the Bell exchanges outside Stockholm, and established a system in Stockholm to compete with the local "Bell" and Independent companies. Conditions remained in this state for some years until the Independent company acquired the "Bell" system and continued its competition with the State exchange.

On January 1st last year, the Independent company had 31,685 telephones within the city limits or one to every ten inhabitants; and including the subscribers to the government system Stockholm now has one telephone to six inhabitants, which is, I believe the most highly developed service in the world, though it must be remembered that competition has been in existence in that city 23 years; whereas in the United States the Independent movement is not yet 12 years old.

Outside Stockholm and within a radius of 45 miles the Independent company recently had 151 exchanges with 6,000 subscribers. This extraordinary development is not yet showing any sign of diminishing, for I find that in 1904, the Independent company gained 6,003 new subscribers.

The Swedish State system had on January 1, 1905, 74,798 in the whole country inclusive of the Stockholm exchange.

In Great Britain competition by Independent companies in every case resulted in a more rapid development of the service, and in the return of good dividends to the investor. Although these companies in consequence of the patent conditions existing at that date and the lack of long distance facilities, were induced to sell to the monopoly at very remunerative terms, the experience of this competition proved beyond doubt that the monopoly could not keep pace with the local companies, and that only the refusal of the government to permit Independent companies to do business after the "Bell" patents expired, enabled the monopoly to perpetuate the discreditable conditions which have existed in the British telephone industry until this day.

The result of competition by municipalities, which it must be admitted can never be as aggressive as that of Indpendent companies, proves conclusively that under monopoly there can be no proper development. Glasgow after twenty-one years monopoly, had in 1901 less than 7,000 telephones; in 1905, after three years' competition, 30,000. Portsmouth in 1902 had 1,012 telephones; in 1905, after three years competition, 4,611. Brighton in 1903 had 1,100 telephones; in 1905 after two years competition 4,000; and I may add that if the splendid equipments, a specimen of which is to be found in the "Interstate" system in this city, and Independent methods, had been adopted, these figures could have been doubled.

It is evident from these that the telephone is not, as "Bell" satellites would have us believe, a natural monopoly. On the contrary, it is impossible to find a community on any part of the globe, without competition, where the telephone is in such general use as to justify the service being termed a general utility. In fact, without competition the people do not become educated to its value as an indispensible adjunct in every department of business and home life. Ask the thousands of farmers using the telephone to-day what they knew of its value, and of the innumerable ways in which it assists them in their daily life, by saving labor, increasing their profits, and improving their social conditions before the Independent movement brought the wires to their farms and connected them with their market town.

Coming to the question of telephone competition in the United States; in view of the marvelous progress made by the Independent movement in the last few years, it becomes a difficult task to add anything to the visible evidence to be found in every state of the union. To have built up a business aggregating two and a half million telephones, representing an investment approximating $250,000,000, within the past eleven years, is an achievement almost without parallel in the history of commerce and inventon. No better guarantee than this is necessary to demonstrate that this Independent movement has come to stay and that the telephone service of the future will be dominated by the supporters of that movement.

As touching the financial aspect of competition, I may say that during the recent government telephone inquiry in Canada, evidence was obtained from all parts of the United States regarding the result of telephone competition, and statements were furnished by many Independent companies regarding the physical and financial condition of various systems. After a careful analysis of these I am satisfied that it would not be possible to find among a similar number of any other class of industrial undertakings more successful results.

Some time ago I saw a statement showing the dividends paid by forty-one "Bell" companies in the United States, and in order to make a comparison I referred to the information furnished to the telephone committee, and compiled a statement of the dividends paid by the Independent companies whose reports were furnished to the Canadian government. These reports from forty-nine companies, representing sixteen states, showed an average dividend of 7.65 per cent, whereas the average of the forty-one "Bell" companies was only 5.2 per cent. These figures undoubtedly indicate that Independent telephone securities have reached a stage where they command the support and confidence of the investing public. More than that, I believe that in the face of present conditions "Bell" securities must decrease in value, while those of the Independents will attain a higher and more stable position in the money market as they develop.

It would appear to me that one reason for the success of the

*Abstract from paper read before the members of the Illinois Independent Telephone Association at their annual convention, continued from the issue of July 21st.

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Independent telephone movement is the fact that the "Bell" monopoly has by its greed and arrogance in the past forfeited the good will of the people. When it was in power it failed to recognize the principle that the accumulation of dollars is not the sole object for which a corporation is created. It overlooked the fact that it owed a duty to the people, in the performing of which it could alone hope to obtain and retain the confidence of the citizens of this great and liberty loving union.

OFFICIAL BULLETIN NUMBER ONE OF THE INTERNATIONAL INDEPENDENT TELEPHONE ASSOCIATION OF AMERICA.

(SECOND SERIES.)

THE CONVENTION.

Judging by the actual work done, the Convention was the most successful meeting of its kind to date. The attendance—double that of last year—was thoroughly representative, and the enthusiasm could not have been surpassed. From the very start the delegates gave evidence that they were prepared to go after the big things in the Independent field. Credit is due in many quarters to the excellent meeting, but the real cause, the principal reason, was the interest taken by the Independent people engaged in all branches of the industry throughout the country—and we must not forget Canada, which sent an active delegation. It was due in a great measure to their presence that the title and the constitution of the Association was changed, so as to extend the membership beyond the United States, thus broadening the scope of the work. If the comments heard on all sides are any indication, everyone is well satisfied with the Convention and the work done during the preceding year. All, we hope, are prepared to render the necessary assistance in carrying on the work henceforth. There is a great deal to be done—our success to date has scarcely more than shown the future possibilities of our organization--but with the co-operation of our members everything is possible; without it, nothing. If the same spirit that made the last Convention such a success is manifested by the Independent people during the coming year in assisting their Association to accomplish the work undertaken, the result will make last year's achievements insignificant by comparison.

Will the Association be the success it should be? You can help answer that question.

CHANGE OF NAME.

In accordance with the change made in the constitution, the Association will now be known as The International Independent Telephone Association of America. For convenience, the last two words of the title will be omitted in general correspondence.

HEADQUARTERS.

The general offices will be continued in the Electric Building, at Cleveland, Ohio. All correspondence should be addressed to the Association here. Independent telephone people visiting the Forest City are invited to pay us a visit.

COMMITTEES.

The Executive Committee and the Committee on Legislation and Litigation are being appointed and their names will be included in the next bulletin, as well as any special policy which they may decide upon in carrying on the Association work.

OFFICIAL REPORT.

In accordance with resolutions adopted at the Convention, the Official Report of Proceedings will be published in book form at an early date for general distribution. This will include a full report of the banquet and all papers and reports presented at the convention. Also a list of all attending, as well as a list of manufacturers and supply dealers, etc., who have contributed to the financial support of the Association.

STATISTICAL DEPARTMENT—MAPS.

Arrangements are being made to obtain very complete statistics for each state during the coming year. This matter will usually be taken care of by the state association, but, whenever necessary, will be handled direct from this office. All Independent companies are requested to render every possible assistance in securing complete and accurate statistics. It will be impossible to accomplish satisfactory results without your co-operation.

The work of gathering data for our state maps, which was temporarily discontinued for a few weeks preceding the convention has been actively resumed. If you operate toll lines—no matter how short—and have not already sent in your data, please do so at once. Don't wait for a personal letter. If you have received such letters—respond promptly.

As shown by reports submitted at the convention, the maps can be prepared in much less time and the expense greatly reduced, if the Independent people will only give our requests for data more prompt attention. Won't you help us in obtaining better results and reducing the cost?

SUPPLY DEPARTMENT.

The "Shield" has come to stay. That fact was amply demonstrated at the last convention, and it seems to be the consensus of opinion that the Supply Department is the best method of further introducing this emblem and is a valuable feature of the organization. It will therefore be continued. All the present supplies will be handled, besides a number of new "Shield" specialties. We will be prepared to furnish everything in the way of "Shield" advertising, but in accordance with our policy previously outlined, will not handle telephone supplies, nor interfere in any way with the regular manufacturers and supply dealers who sell Independent telephone apparatus or equipment.

Among the new specialties handled will be an illuminated sign for exchanges. There seems to be quite a demand for something of this nature, and the Association was fortunate in securing a splendid article at a low price, which puts it within the reach of all. Particulars furnished on request.

We are glad to note an increased demand, since the convention, for the Standard Toll Sign. It will pay any company not at present displaying this sign, to send us their order at an early date, so as to take advantage of the present low prices. The "Shield" is now being used in 42 States.

A new catalog will be issued by September 10th.

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THE EDITOR'S PAGE

THE END OF MUNICIPAL TELEPHONE OWNERSHIP IN GLASGOW.

THE municipal telephone system of Glasgow has been sold to the British Post Office. The city officials' experience with the telephone system has probably been a most disappointing one. At the time the telephone question was taken up, in order to secure a cheaper and more efficient service for the citizens who needed it so badly, it is said that the municipality was led to believe that the Government intended to make the telephone administration a local matter, with the exception of the trunk lines, which were to be operated by the Government Post Office. Government approval of the efforts of the municipality to break down the monopoly of the National Telephone Company was very freely given. A change in Government policy, however, which took place after the Glasgow system had been in operation for some time, brought about a condition of affairs which showed the people connected with the administration of the system that success from now on was impossible.

In the first place, a most curious system had been installed under the impression that the Bell company not only monopolized the service, but had a monopoly of all the patents on all apparatus which was capable of giving efficient results. So the old "ring-through" equipment was installed, and various cumbersome and unsatisfactory engineering methods were employed, which have for a long time made the plant a source of amusement to the up-to-date telephone engineers who visited it. Under existing conditions it was found impossible to make the system profitable. Extensions involved great financial difficulties, owing to the nature of the plant and methods adopted in its installation.

Perhaps if there could have been time enough to make up for losses the system might have been remodelled, and the service carried on with a plant having the features which are now considered essential. The change in policy of the Government, which has arranged to buy the National Telephone Company in 1911, and nationalize the whole service, makes it impossible, however, for the Glasgow corporation to continue to operate its system, as obviously it could not compete with the national Government. The impossibility of successful operation after this date was fixed by the fact that, believing that its license would be renewable on demand it purposely asked for a term lasting only until the year 1913. If reconstruction were undertaken now the expropriation which would have inevitably taken place at the expiration of the license would leave the city with a very large deficit. Sale of the system to the Government at the present time seems to have been the best way out of the muddle.

Although failure to learn how to conduct the business in which it was about to engage before investing led the city into what is by many considered to be a wasteful and extravagant expenditure of its money, there have been some important benefits conferred upon the telephone subscribers. The value of the telephone service to each subscriber has been immensely increased through the connection of many more people than were receiving the service at the time the municipal system was put in operation. The total numbers of subscribers in the city at that time and now are given in round numbers as 7,000 and 38,000 respectively. In the matter of charges, too, results which have been extremely agreeable to the subscribers have been brought about. The National company formerly charged from £25 down to £10 per year. Now, since it has been obliged by competition to reduce its rates in order to get business, it gives a party line service at an annual figure as low as 25s., and other rates have been correspondingly lowered. It is understood that the National company made a bid for the municipal system at its full book value, which is about £15,000 more than the Government paid, and offered to guarantee that the present municipal rates of £5, 5s. per year for unlimited service, with proportionate rates for party line and measured service, should continue for two years. The people of the city, however, in spite of their failure to conduct the system with complete success either from a business or operating point of view, seem to be most unwilling to abandon for a few thousand dollars of cash in hand the advantages which have been brought about by competition in the telephone service.

FOR THE MAN OUTSIDE.

A CIRCULAR suggesting the value of courteous treatment of the public has been issued to the employees of the Boston (Mass.) Consolidated Gas Company by its president, J. L. Richards. His advice is: "Exercise politeness and courtesy at all times. Never lose your temper or allow any personal feeling to interfere with the proper discharge of your duties. Avoid in manner and word any trace of officious importance when carrying out the company's orders. Don't make promises the company cannot fulfil. Above all, don't misrepresent in any particular the true condition of any transaction. Keep your personal appearance up to the mark. Walk smartly and avoid slouching."

We understand that Mr. Richards intends to make the gas company pay, and there is no doubt that the issuance of the present order is a valuable part of his general policy. It is so well put, too, that officials of telephone companies may find it useful without any change.

AN INDIANA HOODOO.

INDIANA is a state which stands high both in the number of its telephones and the character of the service which is given by the companies which own them. Not long ago, however, there came to light an incident which makes us wonder if there is not a wire chief in the state who is a little behind his fellows.

According to the report, there was a line running into a certain exchange which persistently failed to talk. When an operator rang on it she was able to call a party if the weather was good and dry. Finally, however, there must have been a rainy week, for no service could be obtained by subscribers on this line for several days. We have heard of places where if telephone subscribers were only told that the exchange or part of its equipment was disabled they would patiently wait for repairs to be made. The Indiana subscribers on this line must have been people of that sort. But there is a limit to everything, and they determined to have that trouble cleared.

We can imagine a lineman going out to look for the mystery, for it is as such, after a while, in some places that the things which prevent the proper working of a line are put down. The lineman says, "The line is hoodooed, and that is the end of it. What is the use of looking for a hoodoo?" Still the manager had said it must be found this time, so out the man started on his search and at last he reached the place. A wire had been grounded on a tree for so long that the wood had grown over and completely enclosed it.

This is an exaggerated example of the maintenance hoodoo, but there are a good many other lines upon which pretty bad ones could be found. These line hoodoos soon get to be service hoodoos, and it does not take many of them to hit a good sharp rap at the dividends. That is why it pays to have a good wire chief, and see that he does no other work until his lines are in first class shape from the jack to the switch hook, and that everything else in the exchange is fit for connection to them. In the case we have used for an illustration the company would have saved good money if its employees had followed the advice which has been given by many good telephone men, "Don't hunt trouble. Test for it, and when you know what and where it is, clear it."

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

USE OF STREETS IN ABSENCE OF MUNICIPAL REGULATIONS.

The statutes of Wisconsin authorize telephone companies to locate poles and wires in public streets. Acting under this authority, our telephone company commenced the erection of a line of poles in the city and was enjoined by the municipal authorities from continuing its work. We did not have the permission of the municipal authorities, but on the other hand, neither the Board of Public Works nor City Council had passed any ordinance regulating the placing of telephone poles in the streets. The city charter authorized the City Council, by ordinance, by-law or resolution, to keep the streets free from encumbrances and to regulate their use, and provided that no obstruction should be placed in the streets without a written permit from the Board of Public Works, which is given power to regulate the placing of telephone lines in the streets. Parties dissatisfied with the decision of the board have the right to appeal to the Council. Under these circumstances have we not a perfect right to continue the erection of our lines in the streets? If not, would we be permitted by the court to place our poles on some other streets than those we have started on?

S. W. P.

IN some States it is held that where the franchise to use the city streets comes from the State, it is immaterial whether municipal authorities such as village trustees consent to the use or not. New Union Telephone Co. v. Marsh, 89 N. Y. 79. In Ohio a franchise is held to be a contract without consideration where the State law permits the erection of lines in cities. Macklin v. Home Telephone Co., 24 Ohio Cir. Ct. Rep. 446. In New Jersey it is held that a franchise is not needed from local authorities, and that such authorities do not need to designate the streets to be occupied and that the company under the sanction of the State law may occupy the streets of a city without local permission. New Home Telephone Co. v. New Brunswick, 40 Atlantic 628. Were it not for a local decision to the contrary in Wisconsin, the editor would say that your company could continue the erection of its poles and wires in spite of the opposition of the city authorities. In Wisconsin, however, it has been decided that all legislative grants to private corporations to occupy streets with electrical appliances are impliedly subject to the police powers of the municipality, both to designate and to change the location of such plant. It is further decided in the State that a telephone company has no right to place poles in the city streets except under the direction of the Board of Public Works, though neither the council nor the Board of Public Works has passed any by-law or ordinance regulating the placing of telephone poles in the streets. The court would scarcely permit your company to set its poles in any other street, because by so doing it would be controlling the action of the Board of Public Works in regulating the manner of placing the poles on the city streets. City of Marshfield v. Wisconsin Telephone Co., 78 N. W. 735.

RESTRICTIONS UPON THE USE OF HIGHWAYS BY TELEPHONE COMPANIES IN PENNSYLVANIA.

Please inform me through your "Telephone in the Courts" page, in regard to the use of the public highways in the state of Pennsylvania by telephone companies. Where the state or country road is wholly or partly on property can the company set poles without the consent of the property owner and can it trim trees without his consent? Can the company condemn a right of way either on highway or property. C. M. B.

IN the state of Pennsylvania the use of a highway by a telephone company for the erection of its poles and wires is considered to be what is called an additional servitude upon the highway, or a use for which the highway was not intended and to which the abutting owner is therefore entitled to compensation. In this matter there is no distinction between city streets and country highways where the property owner owns the fee to the center of the highway. Lancaster Turnpike Road Co. v. Columbia Tel. Co., 18 Lane L. Rev. 161; Haverford Elec. Lt. Co. v. Hart, 13 Pa. Co. Ct. Rep. 369. The same principle governs the right of the company to trim trees and it must secure the consent of the property owner to do so unless it has already secured his consent to the erection of the line in front of his property, in which case the company would be entitled to trim trees to such a reasonable extent as would be necessary to prevent interference with its lines.

Telephone companies in Pennsylvania do not possess the right of eminent domain which it would be necessary for them to have to entitle them to condemn a right of way either on the highway or property. Pa. Tel. Co. v. Hoover, 58 A. 922.

ENFORCEMENT OF RATE ORDINANCE DENIED WHERE IT BANKRUPTS THE COMPANY.

ONE of the most important suits recently decided by the courts is that of Maryland Tel. & Tel. Company v. Charles Simon's Sons Company, in which the Maryland courts refused to enforce a telephone ordinance because a decree enforcing such rates would bankrupt the company. This was the second hearing of the case in the Court of Appeals of Maryland, it having formerly gone up on demurrer. The lower court entered a decree restraining the company from exacting a greater rate of rental than $48 per annum for business telephones and service connections on a one-party, double copper wire metallic circuit, central energy system, with unlimited calls, and declaring such leases illegal and void. The company averred that its rates were reasonable and that, at the time of the enactment of the ordinance referred to, "ordinary telephone equipment did not include a metallic circuit nor the central energy features; that at that time there were only five hundred instruments in the city, and that the central energy system was unknown, and that therefore these were not then contemplated. It admitted that when it first began operations in the city it supplied a metallic circuit, not because it was under legal obligations to do so, but for purely business reasons, to compete with its powerful rival, the Chesapeake & Potomac Telephone Company. The testimony showed that the cost per telephone increases in rapid ratio as the number of telephones increases and that in 1903 under the old rates there was a deficiency amounting to $70,000, which would increase yearly if the old rates were enforced. Counsel for the complainants argues that the service could still be supplied by deducting the alleged deficiency from the interest on the company's bonds. As this amounted to $2,155,000, which has been sold to innocent parties, and the proceeds of which had been economically used for equipment, the court declined to approve this argument. The court denied the injunctions prayed for because they would evidently force the company into the hands of receivers. This case is particularly interesting because the company under the leadership of George R. Webb, its principal stockholder and organizer, has been making a courageous fight in behalf of Independent telephony. Maryland Telephone and Telegraph Company v. Charles Simon's Sons Company, 63 Atlantic 314.

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QUERIES

TROUBLE WITH NIGHT BELL CIRCUIT.—(734.)

In an exchange which has recently been installed we have trouble with the night bell which sometimes rings during the day. This circuit is so arranged that a key shunts out the night bell relay when this key is operated. The shunt shows a short circuit when tested with a battery and buzzer, but the relay will sometimes come up and stick. Can you tell me why this circuit does not work well? C. R.

The trouble is probably due to too much resistance in your shunt circuit, due to the length of the run between the relay and key, if you have a night bell relay of a type which has a very low resistance. It does not take a great length of copper wire of small size to have sufficient resistance to permit the operation of a relay on a shunt circuit; that is to say, if there is sufficient resistance in the shunt circuit through the key, instead of making an absolute short circuit for the relay you have a condition which permits the current to divide, and if the relay is delicately adjusted sufficient energy will pass through it to cause it to attract its armature.

The first remedy for this difficulty should be to adjust the relay with the armature as far from the pole piece as is possible, and still make sure that the relay will be pulled up at the proper time. The contacts of your shunting key should also be thoroughly cleaned and adjusted, in order that no extra resistance may be introduced at this point. If the trouble still continues the only thing to be done is to substitute a wire sufficiently large to have no appreciable resistance.

HEIGHT OF POLES.—(735.)

We are going to build a line through a rural district, and the question of the height of wires has come up. As far as we can see there will never be many cross arms on the poles and we are wondering how high they need be. Some of our members say we should use 30-foot poles, but I am unable to see why we need go to this expense. Can you advise us? R. J. B.

It would seem as if all that is necessary in your case is to have your wires sufficiently high to avoid mischievous interruptions of the service, and for this purpose 22 or 25-foot poles should be sufficiently long. In places where the lines go by groups of houses it may be well to use somewhat higher construction, and long poles may be required to even up grades, and for street crossings. For the rest of the line the shorter poles will not only save you expense, as they cost less and are lighter, and consequently more easily transported and erected, but their use will probably enable you to avoid branches of trees through which your wires would pass if supported at a greater distance from the ground.

HOWLER CIRCUIT.—(736.)

We are having a great deal of trouble with subscribers who leave their receivers off the hook. As we have no ringing machine with interrupters for a howler circuit we should be glad to have you give us a suitable circuit for this purpose, to use a buzzer or some such device. C. F. L.

In the accompanying diagram, Figs. 736a and 736b, are shown a simple howler circuit and the general type of a relay which is found to give good results in this class of work.

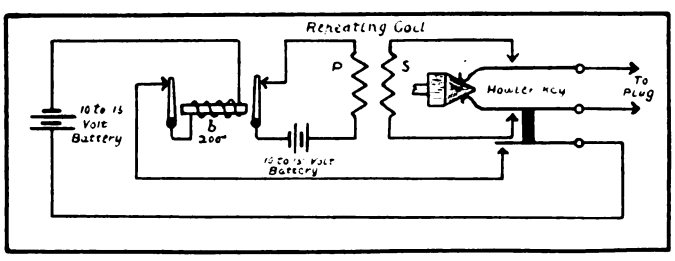

Fig. 736a.

As will be seen, the howler key has connected to its movable springs wires leading to a plug for insertion in the multiple jack or other suitable arrangement for connecting them to the subscribers' line. When this key is operated the secondary winding of the repeating coil is thrown into connection with the line wires, and the local circuit is closed by means of outside contacts of the key through a 10 or 15 volt battery and relay b, wound to a resistance of 200 ohms. The relay b has two contacts adapted to be opened simultaneously when the magnet is energized. One of these is so wired as to open the circuit through the winding of the relay, thus causing it, when properly adjusted, to buzz as its armature is mounted on a spring. The other contact is included in the circuit with the primary of the repeating coil and a 10 or 15 volt battery. The interruption of this circuit sets up in the

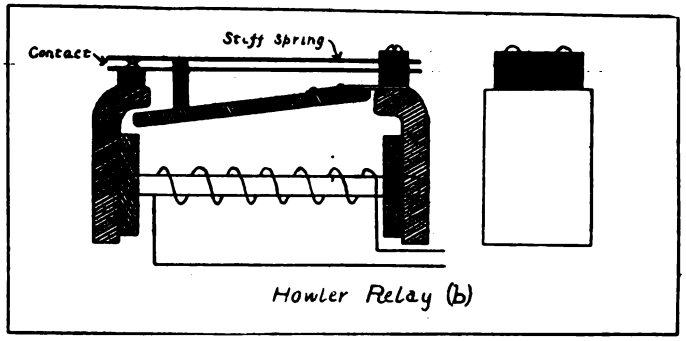

Fig. 736b.

secondary an alternating current, which when led out to the subscriber's instrument causes a characteristic hum in a receiver which is left off the hook.

The repeating coil should have a ratio of transformation between the primary and secondary of about 10 to 1. An induction coil such as is used in a local battery substation instrument will give fairly good results. The relay b should be of such character, and so adjusted as to vibrate at the proper period, that is about 400 times per second.

POLARITY OF RETARDATION COILS.—(737.)

Does it make any difference in a retardation coil having two windings, such as is used in some types of intercommunicating systems, which terminal is joined to positive battery and which to negative. In other words will the polarity have any effect on the retardation? J. N.

In a previous query we have discussed the requirements which must be observed in order that the two windings of such a retardation coil as you describe may "work together," that is to say, produce magnetism of the same polarity throughout the length of the core. Provided this is done it makes no difference whether battery is connected to one end of a winding or the other. If the coil were connected up properly to battery and line, and then the connections of each line terminal and its corresponding battery terminal reversed there would be no difference in the choking effect produced by the coil in the circuit.

SUBMARINE AND OVERHEAD RIVER CROSSINGS.—(738.)

In some of your recent issues I notice that you have described river crossings where both submarine cable and aerial open wires have been used. Can you give me some hints as to how one could determine which plan to use in a particular case? L. G.

Many details must be looked into, of which we will mention a few of the most important. If the river crossing is a broad one and the wires are used for long distance messages, the use of cable may cut down the transmission by an amount which would be objectionable. Its effect should be figured out in order that no mistake will be made. Navigation in the river and the carrying of stones and ice down over the cable by swift currents in the time of freshets might cause an interruption of service.

Open wires are frequently objectionable on account of maintenance difficulties, and the difficulty and cost of securing proper terminals if they must be supported at a great height.

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IN THE OPERATING FIELD

CENTRAL ENERGY SYSTEM TO BE INSTALLED AT CANAL DOVER, OHIO.

AT Canal Dover, Ohio, The Tuscarawas County Telephone Company is now engaged in replacing its old equipment by a modern central energy plant. The capacity of the exchange is being increased from 600 to 1200 telephones and a four party selective ringing system, of the same type as the one which the company has used with success in New Philadelphia, is to be installed.

ITALIAN GOVERNMENT LIKELY TO ACQUIRE TELEPHONE LINES.

THE Italian Government, it is said, proposes to assume control of all telephone lines in Italy. The Minister of Posts, Telegraphs and Telephones is making arrangements to have the new telephone systems erected by the State, which will take over the lines which private companies are now operating. A project is on foot to indemnify the companies owning the lines by means of a series of annual payments which will continue up to the time when the concession ends. It is expected that the telephone receipts will be sufficient to cover this expense and at the same time allow the state to operate the lines, so that no additional funds will be required for this purpose. The leading telephone companies seem disposed to make such an agreement; among these are the Italian Telephone Company and the North Italian Telephone Company. This would give the state control of twenty-four urban systems, including those at Rome, Florence, Naples, Venice, Milan, Turin and other important places.

SISTERVILLE, WEST VIRGINIA, TO HAVE INDEPENDENT SERVICE.

THE West Virginia Western Company is installing a new exchange at Sisterville. A large force of men and several car loads of construction supplies are on the ground and the work is advancing very rapidly. Toll lines will connect Sisterville with Parkersburg, and put the people in communication with the several thousand subscribers on other Independent systems in the State.

BASEBALL REPORTS BY TELEPHONE.

(*Continued from page 50.*)

lines by the boy in the grand stand whose picture is shown with this article. These efforts were looked upon by most of the people who saw them as a joke, and to keep alive the humor of the situation Mr. W. H. Wilson, general manager of the Union Telephone company had drawn and printed some large posters. As a reproduction of the design was published in the convention number of the AMERICAN TELEPHONE JOURNAL it is unnecessary to describe it. The situation was hit off so well that it proved to be a most excellent advertisement for the Independent service.

After a two months' trial of this service the results obtained seem to show that baseball returns can be handled successfully, and that the service is a practical thing. It is a moneymaker from many points of view. In the first place it advertises the company's work in a most effective way. Then, too, it brings in money for what is practically a by-product of the regular service. The handling of these reports by telegraph between Buffalo and the receiving stations keeps them from interfering with long haul toll connections. Even on the short circuits this service does not interfere with the regular traffic, as it starts at about 4:15 and is over by 6:30. This, as will be seen, keeps the toll lines in use for paying business during a part of the day when the number of ordinary messages is the smallest.

For those who may wish to try a similar service to their subscribers the following hint is offered: When it comes to giving baseball reports put a boy on the line; he will do the work better than almost any girl operator that can be found, for he understands the game.

MR. CHEADLE'S ADDRESS AT CHICAGO.

IN the progress of the investigation by the people of Chicago of the telephone situation one of the most important influences should be that produced by the address delivered to the Ways and Means Committee of the Chicago Commercial Association by Mr. C. B. Cheadle, secretary of the Illinois Independent Telephone Association. It is a most thorough summary of the general conditions which have been brought about by the Independent movement and there were given to the association figures which show the remarkable growth of telephone service since the Independent companies began to operate. Especially significant are the statements showing how the Independents have made it possible for the systems of the farmers to be built up until subscribers in this class of territory form a remarkably large proportion of the entire number of telephone users.

In Illinois, where, outside of the city of Chicago, the Independent development is so great and service so satisfactory, Mr. Cheadle has obtained figures showing very closely the exact conditions which prevail. In his address he stated that in response to inquiries made by him of operating companies he had obtained returns from fifty counties, only nine counties in the State having failed to report. Three additional counties failed to report the estimated number of Bell telephones in service, and four the number of Bell telephones in service attached to lines of sublicensee companies. From the figures obtained, however, he shows that the Independents have in fifty counties 123,538 telephones, while the Bell companies have attached to their own exchanges 43,282 telephones in forty-seven counties, and of the sublicensee subscribers in forty-six counties there are 19,910. Development under conditions where competition prevails and in other places where there is no competition were compared, and it was shown that competition is a feature that tends to not only increase the efficiency of the service, but also increases the number of telephones in use. It was also stated to the members of the association that under competition rates are materially lowered, and facts were given to support the statement. This address, coming as it does from one in authority, and covering the situation so thoroughly, is considered to be one of the most valuable contributions which have been made for the information of Chicago business men in this important matter.

INDIANA TELEPHONE AND TELEGRAPH COMPANY TO ERECT $35,000 BUILDING AT CLINTON.

RECENTLY the stockholders of the Indiana Telephone and Telegraph Company held a meeting at Indianapolis and appropriated $35,000 for a new exchange at Clinton, Ind. The building will be a two-story brick structure, 30 x 60 feet, and the equipment is to be modern in every respect.

The growth of the company has been rapid. It was organized in 1897 to supersede an intercommunicating system of 30 telephones and when the first exchange card was printed, in the same year, there were 59 subscribers. Since that time the business has increased until there are now about 800 telephones connected with the exchange.

TOLEDO STREET RAILWAY COMPANY SUPERSEDES BLOCK LIGHT SYSTEM WITH TELEPHONE LINE.

THE Toledo Urban & Interurban Railway Company, which operates an electric line between Toledo and Findlay, Ohio, is installing a telephone system to take the place of block lights which have been in use since the line was first

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established. W. L. Smith, superintendent of the line, expects to have the new system in operation during the latter part of the month. A train dispatcher will be stationed at the mid-way office at Bowling Green, where he will have absolute control of all the cars running both ways the same as dispatchers on the steam lines of the country, with the exception that the telephone will take the place of the telegraph. Superintendent Smith figures that he will thus be enabled to reduce the running time, especially when a car is late.

CITY OF GLASGOW SELLS MUNICIPAL TELEPHONE SYSTEM TO POST OFFICE.

THE town council of the city of Glasgow, Scotland, has within a few days sold the municipal telephone system to the British Post Office. When it was decided to give up the undertaking of supplying telephone service to the people of the city in competition with the National Telephone Company bids were received from the Post Office and from the National Company. The Government offer amounted to £305,000 sterling, exclusive of stores and tools, which are to be taken over by the Government at cost price. The system was sold on the understanding that the Government would continue to operate the plant as a branch of the Post Office service.

It is stated that the National Telephone Company bid £320,000 for the system; but this offer was rejected, as the people of the city, who had fought the British Bell organization for so long a time were unwilling that it should again be in a position to raise rates to the high point from which it had been compelled to make reductions during the time that the rival service was operated by the city.

DECEPTIVE REPORTS BEING CIRCULATED IN KALAMAZOO TO PREVENT GRANTING OF FRANCHISE TO INDEPENDENT COMPANY.

IN Kalamazoo, Michigan, where an Independent telephone company is endeavoring to obtain a franchise, one of the daily papers, the *Telegraph*, has given up its columns to statements favoring the Bell company. The following abstract from a letter published in the other journal tends to show how unreliable is the information furnished the public by the Bell press bureau:

"Editor of the Kalamazoo *Gazette*:

"Regarding the statement in the Kalamazoo *Telegraph*, wherein that paper claims, in connection with the publication of a large map alleged to represent the Bell telephone connections with the city, that the Bell has 660 subscribers here and the opposition has none, I wish to say that THE FIGURES AS PUBLISHED ARE ABSOLUTELY WRONG AND ALTOGETHER MISLEADING.

"The facts are that in this city, outside of its state, or toll, line THE BELL—or Michigan State Telephone Company—HAS NOT A SINGLE SUBSCRIBER IN THREE RIVERS. Neither has it had for a long time. After one of the hottest and bitterest campaigns ever waged against any opposition company by the Bell, in which they went so far as to put in telephones at a yearly rental of $6, and in some instances for nothing, THE BELL FINALLY LEFT THE FIELD, HAVING BEEN WHIPPED TO A FINISH AND DRIVEN OUT OF THE CITY BY PUBLIC SENTIMENT; THE PEOPLE BECOMING THOROUGHLY DISGUSTED WITH ITS UNFAIR AND UNBUSINESSLIKE METHODS.

"During the fight the Home (Independent) Company held to the rate first established—$18 for business houses and $12 for residences—and had no trouble in securing all the business it could handle.

"At the annual meeting of the Three Rivers Telephone Company, held the first of this present month, the following officers were elected: F. H. Case, president; W. E. Clark, vice-president; George T. Wolf, treasurer; M. W. Lott, secretary and manager.

"THE ANNUAL REPORT SHOWED THE COMPANY TO BE IN A VERY PROSPEROUS CONDITION, THERE HAVING BEEN A NET GAIN DURING THE YEAR OF 474 TELEPHONES, AND AT THE DATE OF SAID REPORT THE COMPANY HAD 1,308 TELEPHONES IN OPERATION.

"Mr. Lott informs me that 24 telephones have been installed since the date of the anual report, with many applications now slated for service just as soon as the telephones can be put in.

"During the past year exchanges have been put in at Centerville, Constantine and Jones, and what is known as the Williamsville exchange, located in Cass county, has been purchased. The company has paid out during the past year for construction purposes alone the sum of $21,000.

"The report when made said: 'The assets of the company are over $64,000, and there are now listed applications for nearly 100 new telephones as soon as they can be secured and put in.' This is the official report of this company, one that, for a long time, under the vicious opposition of the Bell company, almost gave up the ghost, but finally the people rallied to its support and TO-DAY IN THREE RIVERS THE BELL COMPANY IS NOT KNOWN OUTSIDE OF ITS STATE LINE, AS STATED ABOVE.

"I make this statement on the authority of the report just issued, and it can be verified by calling at the Home office at any time. E. G. TUCKER.

"Three Rivers, July 14, 1906."

THIRD CONVENTION OF THE VERMONT AND NEW HAMPSHIRE TELEPHONE ASSOCIATION.

THE Vermont and New Hampshire Independent Telephone Association held its third convention at the Davidson Hall, Woodsville, N. H., July 10th. There was a large attendance, and the best of feeling for the welfare of the Association was in evidence. About twenty-five ladies attended the convention with their husbands, and the secretary of the association, Mr. G. W. Buzzell, says that the taking of the ladies into the association meetings is a wise move and will strengthen the association a great deal, as their interests are at stake as much as the men's. The convention was called to order by the president, H. W. Buchanan, of Barton Landing, Vt. He stated that the association is growing stronger every day, and proving to telephone patrons the superiority of Independent telephones for local service at a minimum price. The association now represents a union of companies reaching from Canada to Northern Massachusetts, combining their strength to give better and cheaper service than their competitors. President Buchanan urged that a committee should be elected to take steps toward securing, if possible, a law which will compel all telephone companies to give service without discrimination in prices in any place or county in Vermont or New Hampshire, wherever their lines extend.

Many speeches were made by members from the different parts of the two states. O. D. Eastman, of Woodsville, N. H., made some very important suggestions on legislation. He stated that his telephones had been removed from the railroad stations through the influence of the Bell company. It was alleged that the railroad company (meaning the Boston and Maine) was discriminating between the Independents and the Bell, permitting the Bell company to have telephones in its stations and compelling the Independents to remove their telephones from the stations even while the instruments were placed there without pay, and for the accommodation of the railroad company's patrons. He considered this intolerable and suggested that proper laws should be presented for the protection of the Independent people so they could have equal rights with the New England Telephone Company.

Interesting statements of conditions met in different parts of the territory were made by G. K. Andrews, Northfield, Vt., president of the Orange Telephone Company; G. A. Clough, East Braintree, Vt., president of the Home Telephone Company; A. T. Davis, Marshfield, Vt., secretary of the Molly Falls Telephone Company; M. E. Beckly, manager of the Molly Falls Telephone Company; George B. Shaw, of Exeter, N. H., manager of the People's Telephone Company; F. D. Gleason, of Warren, N. H., president of Baker River Telephone Company; J. S. Gordon, Winona, N. H.; D. C. McGuire, Albany, Vt.

G. W. Buzzell, of the Citizens' Telephone and Telegraph Exchange, St. Johnsbury, Vt., gave a brief talk on the Independent situation as he saw it at the convention at Chicago and urged the use of the "Shield" emblem on every possible occasion.

After the convention the ladies and gentlemen adjourned for an iinformal banquet. O. D. Eastman was toastmaster, and all the members joined with him in the merry proceedings.

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TELEPHONE PATENTS

MULTIPLE SWITCHBOARD FOR TELEPHONE EXCHANGES.

Milo G. Kellogg, Chicago, Ill., patents (No. 822,611; dated June 5, 1906; filed April 24, 1893; serial No. 471,713) a multiple switchboard for telephone exchanges.

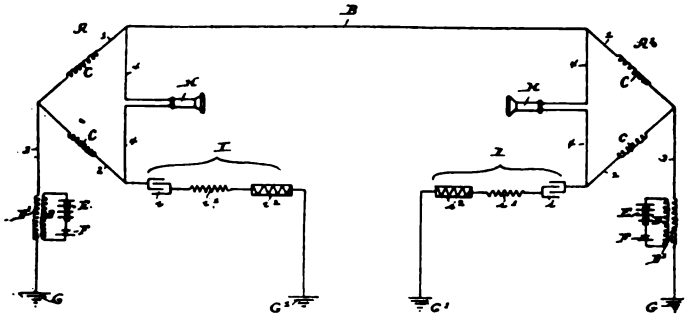
This invention relates to a telephone exchange system in which the lines are connected to apparatus of a type which has been greatly modified since the original application was filed.

TELEPHONY.

Isidor Kitsee, of Philadelphia, Pa., patents (No. 824,030; dated June 19, 1906; filed July 23, 1904; serial No. 217,824), an arrangement of devices in a telephone line.

The inventor refers to the difficulties, such as the inductive influence of neighboring wires and the difference of potential of the ground near the terminals, which cause the passage, in a grounded telephone line, of currents so heavy as to drown the voice currents. He states that his experiments showed such noises to be more powerful as the grounded end of the wire was approached.

To overcome this difficulty the arrangement shown in the accompanying diagram was devised. D^1, D^1 are grounded secondaries of induction coils at subscribers' stations, connected through coils C C C C to line and the devices I, I, respectively. The latter consist of devices having the electrical properties



of resistance, capacity, and inductance, so arranged that an operator may duplicate the electrical conditions existing in line B. Receivers H, H are bridged across the resistances C, as shown in the diagram.

ANCHOR.

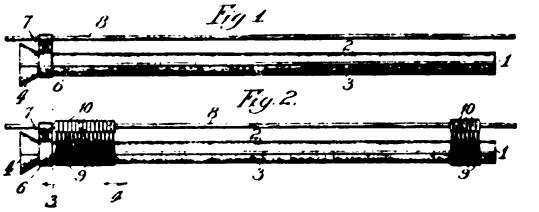
Jasper Blackburn, Chillicothe, Mo., patents (No. 812,003; dated Feb. 6, 1906; filed May 24, 1905; serial No. 261,984) an anchor for guy wires.

This patent relates to that type of anchors which is adjusted after being inserted in the ground. It essentially consists of a circular base plate to which are attached arc-shaped guide bars. These bars are joined together at the top by means of a cap, having a threaded central vertical hole. Between the guide bars is a block to which are attached two wings which engage lugs in movable plates, parallel to the base plate, but just above it. In operation a hole is dug the desired depth and a wire or rod attached to the anchor, which is then placed in the ground. A long handled key having its lower extremity threaded is then inserted in the cap of the anchor and screwed down. This motion is to be continued until its end is brought in contact with the block attached to the wings. These are then designed to be forced outwards to cause the movable plates to be pressed into the adjacent earth. By means of the adjustable lugs the two wings are enabled to force the holding plates a certain distance, and then by lifting the block attached to the wings the latter can secure a new purchase upon two lugs behind the others, and thus the plates are forced into the ground a distance sufficiently great to hold the anchor immovably.

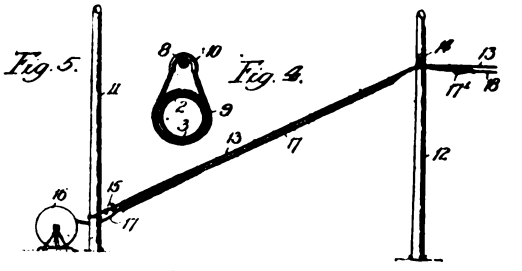
METHOD AND APPARATUS FOR HANGING AERIAL CABLES.

Ralph S. Peirce, Chicago, Ill., patents (No. 825,070; dated July 3, 1906; filed February 27, 1905; serial No. 247,490) a method and apparatus for hanging aerial cables.

This method of hanging cables is best understood by refer-



ence to the accompanying illustrations. In Fig. 1 is shown a tube or "cartridge" which carries the marline cable hangers (Fig. 4). (These hangers are described in an application filed by Ralph S. Peirce, April 27, 1905, serial No. 247,489.) In detail the operation of cable hanging is as follows: The messenger wire, 13, is first put up along the entire route that the cable is to follow and its end brought down to the pole, 11. Hangers are strung on the cartridge, 15, and the messenger is fastened to the pole after being passed through the hangers, replacing the temporary bar 8. The running rope, 18, which has previously been laid alongside the messenger wire in the cable supports, 14, is secured to the end of the cable, 17, and the cable is drawn over the clamps, 14, and along the messenger wire to the end of the run. A man stationed at the tube, near the pole 11, slides the hangers off the tube and onto the cable at regular intervals. Each hanger is intended to cling to the cable sheath and slide along the messenger wire as the cable is pulled over the supports. It is evident that there will be some wear on the sheath of the cable and on the marline of the hangers as the cable is pulled



over the supports. To lessen this wear the supports are made of a special form and polished to prevent friction.

TELEPHONE SWITCH-HOOK.

William A. Fricke, Chicago, Ill., patents (No. 824,351; dated June 26, 1906; filed November 6, 1905; serial No. 285,961) and assigns one-half to McMeen & Miller, Chicago, Ill., a telephone switch-hook.

This invention relates to a switch-hook manufactured by twisting a blank punched from sheet metal into the form described in the patent.

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

SILVEY STORAGE BATTERIES WITH ARMORED TYPE PLATES.

W. L. SILVEY of Dayton, Ohio, who in the past sixteen years has received some 34 patents relating to storage battery work, was granted an additional patent on July 3 last, which embodies some new features in storage battery plate construction.

The first illustration shows an individual plate which is designed to securely hold the active material in the framework and at the same time permit of free access of the electrolyte to a large superficial area of the active material. Each plate is composed of two half grids which are cast from lead containing a considerable percent of antimony so as to give them great mechanical strength. Perforated sheet lead is placed over the inside of each half grid and this metal is forced into the framework so as to form a series of pockets. The two halves are filled with active material, closed, and securely riveted together, forming a complete plate. With this construction it is said to be practically impossible for the active material to be lost from the plate, as it can only leave the plate through the small holes in the perforated pockets.

The grid work is divided up into comparatively small units about one-half inch square, which provides a very large percent of contact surface between the surface of the plate and the active material. This partly accounts for the uniform voltage maintained throughout the discharge of a battery of this type. These features make a battery which is particularly adapted to telephone work, which requires a constant voltage in order that the equipment may operate in the most satisfactory manner.

The second illustration shows a complete cell in a glass jar,

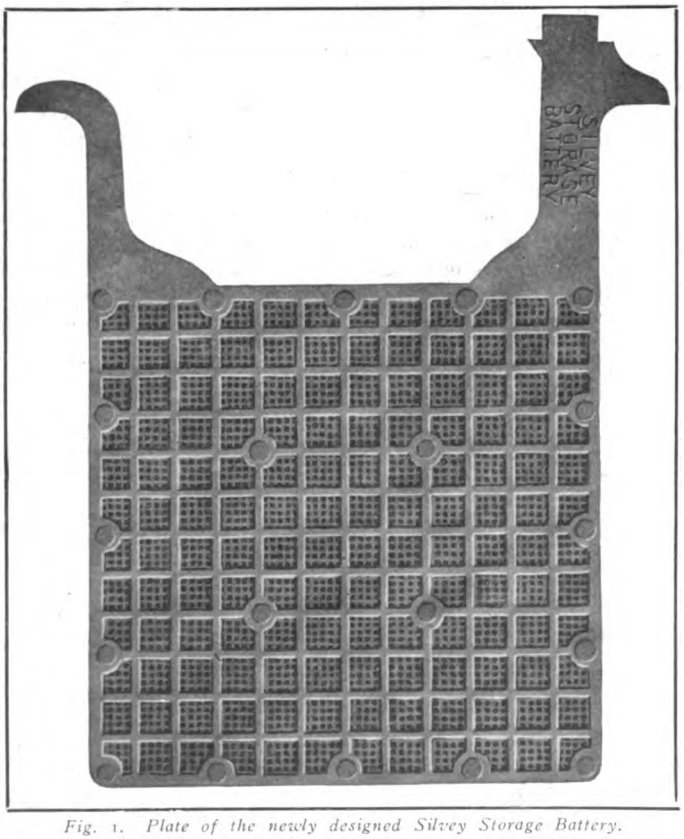

Fig. 1. Plate of the newly designed Silvey Storage Battery.

such as is used in telephone work. Heavy lead links reach from cell to cell. The connecting straps which bind the plates of the elements together are cast with short hard lead bolts projecting upward, so that the connecting links can be securely screwed down by means of large lead nuts which turn freely on the bolts. In this way an exceptionally good connection is secured and at

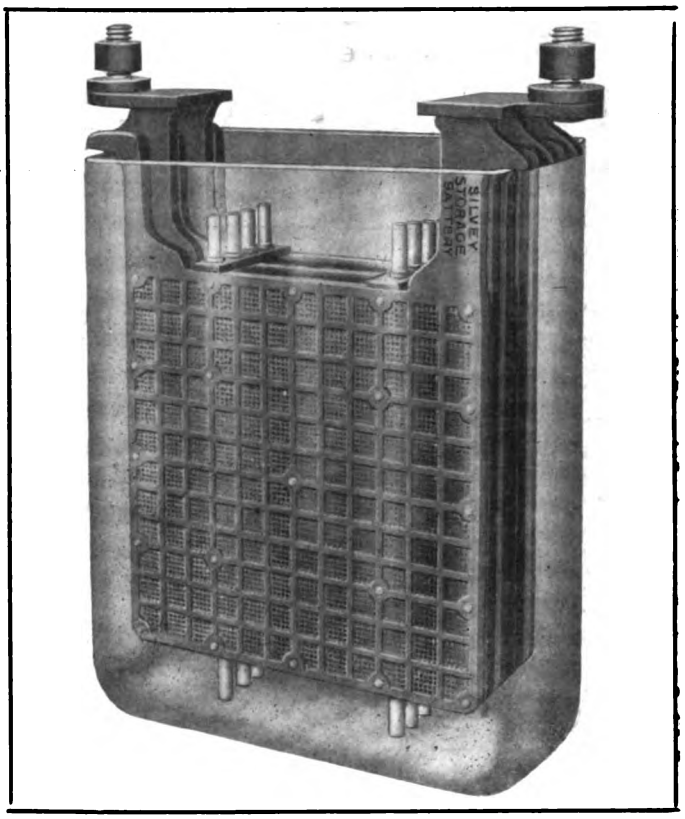

Fig. 2. Silvey Storage Battery Plates Assembled in Glass Cell.

the same time the individual cells can at any time be disconnected, should occasion require.

The Dayton Mfg. Company of Dayton, Ohio, has prepared to turn out a complete line of Silvey Storage Batteries having armored type plates built in standard sizes from 6" x 6" up to 18¾" x 32", so that cells can be produced varying in capacity from 20 to 20,000 ampere hours. For this work a large amount of new machinery has been installed, including perforating machines, hydraulic presses, etc., and several thousand plates have already been produced.

THE HERCULES ANCHOR.

WHILE there are many patented anchors on the market, none have been able to entirely take the place of the old style "dead men." When the W. G. Nagel Electric Company of Toledo, Ohio, put upon the market Hercules malleable iron anchors, it felt assured that wherever the old style "dead man" could be used, the Hercules anchor could be installed at a less expense and do the work equally as well with a longer guaranteed life.

The plate proper of the Hercules anchor is made of the best grade of malleable iron, the heavy center core being strengthened by braces. There is a reinforced rib around the edge of the plate to add additional strength.

It is widely admitted that malleable iron is the slowest to rust of any of the irons, and when buried will last a lifetime. The plate, being malleable iron, cannot break, no matter to what strain it may be subjected, which is not the case with cast iron, no matter how heavy it is cast.

The rod of the Hercules anchors has a welded head of size

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1600 INSTALLED IN ONE STORE IN PHILA. YOU KNOW JOHN KNOWS.

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LARGE CATALOGUE 1906
No. 10 SHIELD Automatic

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For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE—At a bargain, three 100 drop Express type switchboards all in good working order. Will sell either the drops or the entire board. Address, Covington Home Telephone Company, Covington, Ohio. 646

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

DRAUGHTSMEN—Mechanical, electrical, structural, architectural—are at a premium. In a recent issue of "Opportunities," our monthly publication, we listed 104 positions for draughtsmen at salaries of $900-$2,500. Sample copy of "Opportunities" is free for the asking. Hapgoods, 305 Broadway, New York. 464

WANTED—Position as superintendent or in the auditing department. After August 15th. Ten years' experience in practical telephone work. Address Box 93, Grand Forks, N. D. 650

POSITION WANTED—A telephone engineer at present employed by one of the largest manufacturing companies desires change of position on account of health. A position is desired where there will be a chance for some outdoor exercise. Position with operating company preferred. Salary expected not less than $120 per month. Age 29; married. References will be given interested parties.

Thoroughly familiar with all forms modern telephone equipment, cable work, battery maintenance, etc. An excellent opportunity for moderate sized exchange to secure the "right man." Ten years' practical experience. Address, Box 652, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York city. 652

WANTED—Three men who are familiar with the work of cabling telephone exchanges. Attractive position to men who are capable of making plans and figuring lengths of cables. Location, New York City. Address, Box 649, care THE AMERICAN TELEPHONE JOURNAL, 100 William Street, New York City. 649

WANTED—Position as manager or superintendent by young man with exceptional ability. Must be an enterprizing Independent operating company. Have had eleven years' experience. Address, Box 651, care THE AMERICAN TELEPHONE JOURNAL, 100 William St., New York City. 651

WANTED—Every wire chief to write for our proposition as a side line. No samples, no time lost from regular work, good pay. Address Jester & Millikan, Marion, Ind. 643.

WANTED—Two or three first class trouble and P. B. X. men. No others need apply. State experience and wages expected. Address, Box 647, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 647

WANTED—Position as manager of telephone system not smaller than 1500 subscribers. Have served present employers five years as manager. Am graduate in telephone engineering. Netted my company 25 per cent on the investment last year. If you want dividends, write me. Can furnish best of reference from present employers. Salary reasonable. Address, Box 648, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 648

EVERY COIL

of **Roebling Double Galvanized Telephone Wire** bears a tin tag and lead seal upon which the word "**Roebling**" is stamped.

Don't accept Wire without the **Roebling Seal.**

JOHN A. ROEBLING'S SONS CO., - TRENTON, N. J.

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sufficient to stand the breaking strain of the rod. The company states that great care is taken in welding the eyes of the rods, to prevent the chilling of the iron and weakening of the rod. When the anchor is properly set it pulls against earth which has not been disturbed nor loosened by digging. Heavy rains, therefore, will not cause the anchor to creep by washing the earth back of the anchor plate or pack loosened earth ahead of the anchor.

THE NEW CENTRAL ENERGY SWITCHBOARD.

BY working out a principle which, in its application to telephone work, is comparatively new the Vote-Berger Company, of La Crosse, Wis., has produced a common battery switchboard which, aside from its decided novelty, is extremely interesting on account of the numerous important advantages which it is claimed to secure. In stating the reasons which led to the investigations which resulted in the development of this switchboard, the company mentions the disadvantages of the common battery system employing relays for operating line signals, as follows:

There are always one or two relays for each subscriber's line. These relays are liable to be burned out or shorted from high voltage on the line.

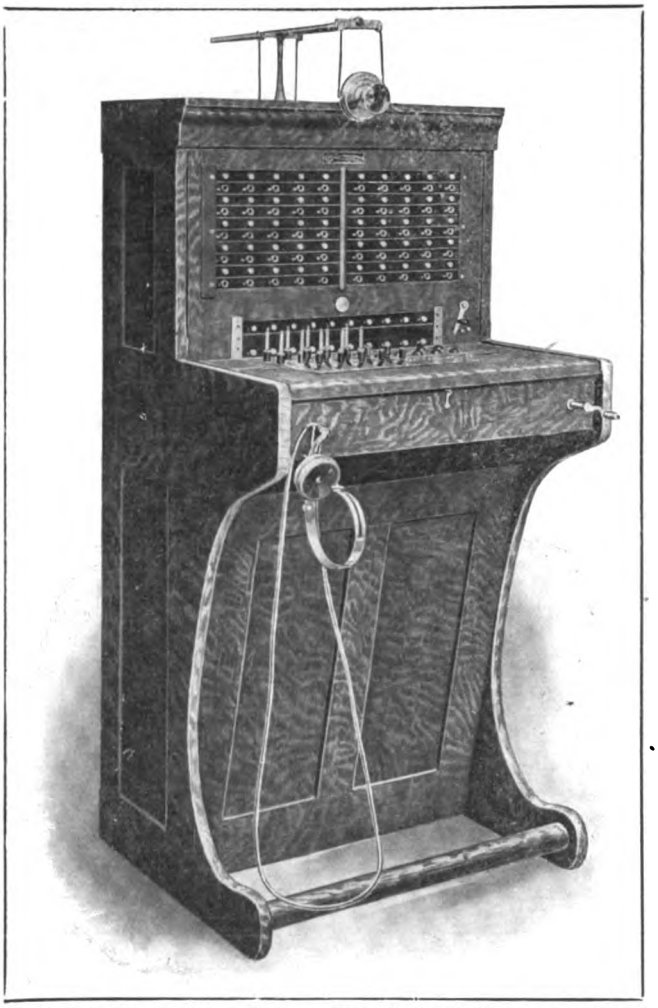
They are extremely liable to get out of adjustment.

The contact lighting the lamp is liable to be dirty and not make.

There must be at least four wires in case only one relay is used, and from eight to ten in case two relays are used for one line.

Inasmuch as the relays are too bulky to mount in the switchboard cabinet, they are usually mounted on a special relay rack. This involves the running of an expensive cable from the switchboard to the rack.

The number of wires involved means that there are many soldered contacts; the soldered contact, although the best means known, is one of the chief causes of trouble in the central energy switchboard.



Small Switchboard Using the Iron Wire Ballasted Circuits Introduced by the Vote-Berger Company.

In the Vote-Berger iron wire ballasted switchboard the battery current is fed out through the line lamp and through an iron wire ballast direct to the subscriber's line. The circuit is closed in the same manner as in the ordinary type of relay, by the removal of the subscriber's telephone from the switch hook. When the operator answers, the battery and lamp are cut off at the jack by the insertion of the plug. The ballast is such that on a line of maximum distance from the central office the subscriber's line lamp will give a good signal. On a line of minimum distance from the central office the extra current passing through the ballast heats it, and increases its resistance enormously. This function takes place instantly, and the resistance of the ballast under such conditions is such that the voltage across the line lamp is only what the lamp is designed to withstand. Moreover, the ballast will protect itself and the lamp from external voltages. The advantages claimed for this system are as follows:

Extreme simplicity.

Only two wires are needed as against from six to ten in case the other style board is used.

There are no moving parts about the switchboard to get out of adjust

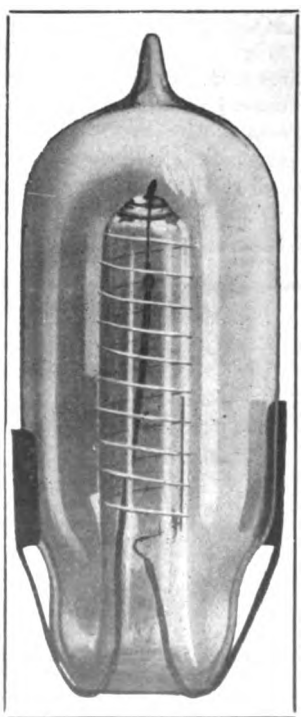
There are no contacts to get dirty and fail when a signal is intended.

The ballast is so small and light that it can be placed directly in the switchboard itself, thus saving the floor space of the relay rack, the relay rack itself, and the cable running from the rack to the switchboard.

The clearing out signals in the cord circuits, which are worked in the same manner, are said to be positive in action. The use of this system has enabled the company to design a switchboard in which there are no relays nor moving parts, with the exception of one low wound relay to each section for operating pilot lamp.

The company has already made one installation of this type of board, which is said to be working very successfully. It is prepared to give out full information to those who wish to investigate it thoroughly.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Rochester, N. Y., reports having closed contracts for switchboards in the following places: St. James, Minn.; Stites, Idaho; Palouse, Wash.; Weatherford, Tex.; Seattle, Wash.; Rochester, N. Y.; Syracuse, N. Y.; Minneapolis, Minn.; Carbury, N. D.; Webster, N. Y.; Sodus, N. Y.; Mt. Vernon, Wash.; Eminence, Ky.; Plain City, Ohio; Columbus, Ohio; Caldwell, Idaho; Esmont, Va.; Rome City, Ind.; Delaware, Ohio; Lyndonville, N. Y.



Vote-Berger Iron Wire Ballast.

THE EDWARDS-HINE COMPANY, 5 and 7 Pearl street, Grand Rapids, Mich., has developed its combination wood and steel filing cabinets to a remarkable degree of perfection. We are all familiar with the multiple-unit type of cabinet, but this company has carried the multiple-unit system to its logical conclusion and has provided for each unit-section numerous interchangeable filing drawers of styles to suit the peculiar requirements of the users. It is claimed that 1,200 different combinations can be made in a single section of the new cabinet.

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We Manufacture

Cords for Telephones and Switchboards : : :
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IF YOU SUSPECT

that the Accounting and Filing Department is the weak point in your Exchange management, write to us.

We can supply you with one of our Stock Systems of Accounting Records and Filing Devices or design a new system for you. We revamp old, poor, or outgrown systems and make them more efficient. Can save you Time, Labor and Expense.

Write for information. Do it to-day!

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Telephone Systems Department
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Catalogue No. 710
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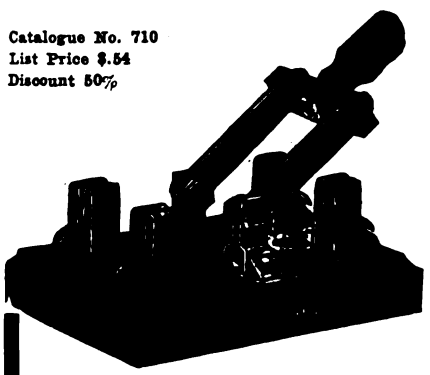

Every Small Company

should write to us before purchasing an expensive switchboard.

We have designed a low priced switching device for small companies which employs call bells in connection with the

TRUMBULL "U" SWITCH
CLIP

The reliability of the Trumbull Switch recommends it for this purpose. You don't have to purchase a drop switchboard until the growth of your exchange requires it, and then you can use these switches for other purposes.

Write for diagram and information.

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618 Woodford Ave., Plainville, Conn.

THE HUNDREDS

OF SMALL LOSSES

resulting where the old manual method of timing toll messages is used soon amounts to a large total.

THE CALCULAGRAPH

makes a record of every overtime charge—prints the time connected and the elapsed time on a card.

It makes no clerical errors.

Write for booklet.

THE CALCULAGRAPH COMPANY
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THE WEEK'S MESSAGES

NEW COMPANIES.

MACOMB, ILL.—The formation of a new telephone company, which will take in all of the farmers' lines, is under the direction of T. J. Dudman and others. The new company will take over the franchise granted some time ago to the company known as the Farmers' and Merchants' Telephone Company. The franchise was formerly the property of Charles Zimmerman, Ed. Alters and John Berry, who have transferred it to the new company.

BIPPUS, IND.—The Bippus Telephone Company is the name of the new company which has taken over the property of the Luther Telephone Company. In addition to changing the offices from Luther to Bippus, which place is to be the headquarters of the company, arrangements will be made for the overhauling of the entire system and for building new lines in the surrounding territory. The officers of the new company are: President, Melvin E. Zent; vice-president, John Struble; secretary, Jacob Lahr; treasurer, Maro Knight.

TRIUMPH, MINN.—A new Independent telephone company, to be known as the Cedar Lake Telephone Company, has been organized by the farmers west of Monterey. The company is composed of about thirty farmers of Cedar, Elm Creek and Kimball townships, Jackson County, and it is its intention to make connections with the exchange at Triumph. The officers are as follows: President, S. P. Pope; vice president, M. Kassaulke; secretary, C. T. Swanson; treasurer, Carl Sjogren; directors, John Holtz, August Peterson and Emel Olson.

NORTH LOUP, NEB.—The Loup Valley Independent Telephone Association has filed articles of incorporation with provision for a capital stock of $20,000. Among the incorporators of the new company are C. E. White, John Boettger and A. M. Stewart. The principal field of operation will be in North Loup.

SYKESTON, N. D.—The Sykeston, New Home and Roosevelt Telephone Company has been incorporated with a capital stock of $10,000.

POMEROY, OHIO.—A new Independent telephone company, the Citizens' Telephone Company, is being organized at Pomeroy by Jasper Jividen, G. W. Nease and Sam Baremore. The new company will build a line to Syracuse.

DUNCANNON, PA.—The organization of the new Independent telephone company, which is to build lines from Montgomery's Ferry to Enola, was completed at a meeting at Duncannon by the election of the following officers: A. L. Shearer, president; Z. T. Shuler, vice-president; E. Walt Snyder, treasurer; J. P. Aiken, secretary and general manager. The company will be known as the Eastern Perry Telephone and Telegraph Company and will be capitalized at $5,000. Connection will be made with the lines of the United Telephone Company.

HARRISBURG, PA.—The Philadelphia, Pittsburg and Erie Telephone Company has been organized for the purpose of developing long distance telephone business in Pennsylvania in connection with the United Telephone and Telegraph Company and other Independent companies in the State. It is rumored that a charter is to be granted to the company on August 7th and that large sums of money will be expended in extending the service in Pennsylvania and parts of New York, where the United company operates.

PLAINVIEW, TEXAS.—A telephone company to be known as the Central Plains Telephone Company has been organized at Plainview. It will have a capital stock of $10,000. A local exchange will be installed at Plainview and toll lines built from that city to Hereford, Amarillo and other points. The directors of the company are: L. Lee Dye, Charles McCormack, T. B. Irwin, W. B. Martine and H. C. Randolph.

PASCO, WASH.—The Twin City Telephone Company, of Pasco, has been incorporated with a capital stock of $20,000. The incorporators are R. A. Klinge, A. F. Brown and E. E. Klinge.

FRANCHISES.

BERKELEY, CAL.—The Home Telephone Company of Oakland, Cal., is endeavoring to secure a fifty year franchise at Berkeley.

CULVER, IND.—The local telephone men of Culver, Ind., aided by Theodore Thorward, manager of the South Bend Home Telephone Company, are endeavoring to obtain a franchise at Culver.

ABERDEEN, MICH.—A franchise has been granted by the city council to E. C. Finch for the establishment of an Independent telephone system in opposition to the Bell Telephone Company. It is expected that the Hoquiam city council will also grant a franchise to Mr. Finch, and that the two towns will have the benefit of the same service.

WEST POINT, NEB.—The Cuming County Independent Telephone Company has been granted a franchise to construct a telephone system at West Point.

RUTLAND, VT.—The stockholders of the Albany Home Telephone Company, of Albany, N. Y., are petitioning the Rutland authorities for a franchise to build and operate a telephone system in Rutland. If the franchise is granted a stock company will be formed and lines built throughout Vermont.

FINANCIAL.

COLUMBUS JUNCTION, IA.—The capital stock of the Columbus Junction Telephone Company has been increased to $20,000.

GRAND RAPIDS, MICH.—The Citizens' Telephone Company at its regular monthly meeting declared a quarterly dividend of 2 per cent.

FLEMINGTON, N. J.—The Farmers and Merchants Telephone Company has declared a semi-annual dividend of 2½ per cent. The capital stock of the company has also been increased from $30,000 to $40,000 for the purpose of extending its system.

DU BOIS, NEB.—The capital stock of the Du Bois Telephone Company has been increased to $10,000.

SENECA, N. Y.—The Seneca-Gorham Independent Telephone Company has declared a dividend of 6 per cent.

SALT LAKE CITY, UTAH.—At a meeting of the board of directors of the Utah Independent Telephone Company it was decided to declare another dividend of 1 per cent. This is the third quarterly dividend.

ASHLAND, VA.—At the annual meeting of the stockholders of the Virginia Telephone Company, held at Ashland recently, a 10 per cent. dividend was declared.

BELMONT, WIS.—The Belmont & Pleasant View Telephone Company has increased its capital stock from $5,000 to $10,000.

MONROE, WIS.—The Monroe Telephone Company has declared a six per cent. dividend on the stock of the company.

COMBINATIONS.

LA HARPE, ILL.—It is rumored that the Mississippi Valley Telephone Company, which operates exchanges at Carthage, Dallas City, Warsaw and Hamilton, has acquired the La Harpe Telephone system.

COLUMBUS, IND.—It is quite probable that the Citizens' Telephone Company, of Columbus, will acquire the property of the Hope Telephone Company, negotiations now being under way.

ORIENT, IA.—The Town Telephone, Light and Traction Company, of Greenfield has acquired the exchange of the Nexinville Telephone Company in Orient and will take possession at once. It is the intention of the new management, if possible, to consolidate all the Independent telephone companies in that part of the country.

GRAND FORKS, N. D.—The telephone line known as the Edwards-Wood & Co. line, formerly the North Dakota Telephone Company, has been purchased by C. E. Burgess.

BRITTON, S. D.—The Social Telephone Company is negotiating for the control of the new telephone line now being built to the southeast of Britton. It is quite probable the line will be absorbed at once by the Social Company.

INGOMAR, O.—There is strong probability of the Ingomar Telephone Association being merged with the Preble County Telephone Company of West Alexandria.

CLOVERLAND, WASH.—The Farmers' Telephone Company, of Cloverland, recently organized, has consolidated with the Cloverland Telephone

NEWS—WANTED

THE matter contained upon the Message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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You remember that the poet says:

"Thus times do shift; each thing his turn doth hold;
New things succeed as former things grow old."

It is true everywhere—you want the new and better—you like originality, initiative, ideas.

We made the first telephone in the Leader Jr. style, and nearly every one laughed—a few were wiser and encouraged us by orders. We kept on making improvements and forced our competitors to follow. Through the demands of the trade we now see this later and better style cabinet universally adopted. Our Leader Jr. is still by far the best, not only in design, but in the perfection of detail. We do not charge anything for originating, but don't you think that eleven years of successful manufacturing experience can be made of value to you?

We have new Catalogues in the press. Are you sure you are on our mailing list?

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Our New Bulletins describing the

UNITYPE SWITCHBOARD

Are Now Ready

It Will PAY YOU to Read Them

We will mail them free upon request. Besides describing Unitype Switchboards they contain information useful to every telephone man :

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Cut this out and enclose with a Postoffice or Express Money Order or A DOLLAR BILL, at our risk.

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Enclosed find.. .....for One Dollar ($1.00)
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THE WEEK'S MESSAGES

Company. Additional lines will be constructed between Asotin and Clover land to take care of the new business.

PERSONAL.

CHARLES E. MONROE, formerly engineer for the Ericsson Telephone Company of New York, and for the last year connected with the Sales Department of the S. H. Couch Company, of Boston, Mass., has resigned his position and is now with the White Sewing Machine Company in its automobile department. Mr. Monroe will be located in New York City and will have charge of the repair department. He is very well known in the telephone field and his many friends will undoubtedly be sorry to learn of his going out of the telephone business.

J. T. PELLANGER, formerly with the Consolidated Telephone Company of Buffalo, is now manager of the Home Telephone Company of Schenectady, N. Y.

MISCELLANEOUS.

RICKETTS, IA.—The Ricketts Mutual Telephone Company has arranged for connection with the Soldier Valley Mutual Telephone Company, each company agreeing to build one-half of the proposed line.

COLUMBUS, O.—At Linden Heights, a suburb a few miles from the city, a new exchange has recently been opened by the Citizens' Telephone Company. Although this portion of the city has been recently developed, the exchange starts off with 63 subscribers and others applying for connection. This portion of the city is growing rapidly, and the company expects that it will soon have one of the most important of the small offices forming its system.

New Construction in the Field

PINE BLUFF, ARK.—Many improvements are being made by the management of the New Telephone Company at Pine Bluff and further extensions of the system are under consideration.

FULLERTON, CAL.—The Home Telephone Company, of Los Angeles, is taking steps to establish a telephone system at Fullerton.

SAN DIEGO, CAL.—The Home Telephone Company's proposed improvements represent an expenditure of about $10,000. They will include the construction of lines to Alpine, Descanso, Del Mar and other points. It is the intention of the company to have the entire county covered with a net work of lines.

BOLTON, CONN.—The Bolton & Coventry Telephone Company is building a new line to the Manchester exchange to take care of its increasing business.

KANKAKEE, ILL.—The Eastern Illinois Independent Telephone Company is planning many extensions. A line will be built from Chebanse to Gilman, giving the company connections with L'Erable and a number of smaller towns. Connections will be made with the Watseka Home Telephone Company at Clifton and Sheldon, and it is also rumored that long distance service to St. Louis will be secured through the Kinloch Telephone Company, of St. Louis.

MINIER, ILL.—The Minier Mutual Telephone Company, which recently increased its stock from $15,000 to $25,000, expects to make a great many improvements in its system.

OTTAWA, ILL.—The lines of the Ottawa Home Telephone Company are being extended in many directions.

ROCKFORD, ILL.—The Home Telephone Company, which is building lines to Winnebago and Burritt, is to build additional lines to Pecantonica and Seward. Connections are to be made with Independent companies in other parts of the county.

DALEVILLE, IND.—Many improvements and extensions in its system are planned by the Daleville Telephone Company.

NEW CASTLE, IND.—Considerable new construction work is to be undertaken by the Citizens' Telephone Company, of New Castle, Ind.

SOUTH WHITLEY, IND.—The lines of the Whitley County Farmers' Mutual Telephone Company are being extended and its system generally improved.

DYSART, IA.—The Wettstein Telephone Company, with headquarters at La Porte, expects to construct lines into Dysart, and establish an exchange at that place.

EAGLE GROVE, IA.—The construction of the system of the Eagle Grove-Norway Telephone Company will be commenced very soon.

KELLERTON, IA.—The Kellerton Mutual Telephone Company has decided to connect with Mt. Aye over the Southern Iowa Telephone Company's lines.

EMPORIA, KAS.—The Emporia Telephone Company, which has recently installed a new switchboard to take care of its increased business, contemplates further improvements in its lines.

MANKATO, KAS.—The Mankato Mutual Telephone Company, which now has eight mutual party lines in addition to its toll lines, has recently constructed a new line, and expects to make other additions to its system.

LIBERTY, MAINE.—The lines of the Liberty & Belfast Telephone Company are to be extended to East Knox.

NORTH ANSON, ME.—The Farmers' Telephone Company is building a line to Embden. An exchange is to be established at North Anson and another line built to Solon.

TORAH, MINN.—The Torah Telephone Company expects to build about fifty miles of new lines. The company already operates a line between Torah and Cold Spring with a number of other branches.

KANSAS CITY, MO.—The Home Telephone Company has established a new branch office at Kansas City.

MONTAUK, MO.—A new line is being built by the Farmers' Telephone Company from Montauk to Licking.

RICHMOND, MO.—The Richmond Telephone Company is planning many improvements in its system.

HARRISBURG, NEB.—About forty miles of new line will be constructed by the Overland Telephone Company.

HILTON, N. Y.—The Hilton Telephone Company, which has recently increased its capital stock to $15,000, will make improvements in its system.

GOSHEN, O.—The Citizens' Telephone Company has installed a telephone plant at Goshen, which is connected with its service at Clinton.

WEST MILTON, O.—A new telephone exchange has been installed at Fidelity by the West Milton Telephone Company, of West Milton, O.

OXFORD, O.—The system of the Oxford Telephone Company is being materially extended.

ENTERLINE, PA.—The Enterline-Halifax Telephone Company, recently incorporated, is to construct telephone lines in Enterline, Millersburg, Elizabethville, Carsonville, Powis Valley and Halifax and will establish exchanges at those places.

SHARON, PA.—The Mercer County Telephone Company is to construct lines to Sheakleyville and Hadley. It will also form connections with the Rural Telephone Company of Springfield and Findley townships at Blacktown, where the latter company will install an exchange.

MEXIA, TEXAS.—An Independent telephone line is to be built at Mexia by Weir Bros. & Weir of Winnsboro.

COALVILLE, UTAH.—The Utah Independent Telephone Company, of Salt Lake City, will build lines to Coalville and Kamas.

EDWALL, WASH.—A telephone line is being built by Messrs. W. H. Coleman, W. L. Herman, K. M. Rinker, Wilson T. Jayne and others. It is the intention of the owners to connect this farmers' line with the Edwall central station.

EVERETT, WASH.—The Farmers' Mutual Telephone Company will expend $11,000 in the construction of a new exchange at Everett.

SPOKANE, WASH.—The Home Telephone Company is planning to erect a $60,000 office building at Spokane.

WALLA WALLA, WASH.—The Kerr-Gifford Grain Company is putting in a telephone line from Walla Walla to Spofford.

WHEELING, WEST VA.—The National Telephone Company is extending and improving its system throughout Bellaire, Ohio.

EAST TROY, WIS.—The exchange of the East Troy Telephone Company is to be materially enlarged and improved.

FOOTVILLE, WIS.—The Footville Telephone Company has under construction a line to Magnolia.

NORTH LAKE, WIS.—The Badger Telephone Company is planning to extend its lines east from Mapleton toward North Lake and south to Stone Bank toward Nashotah, taking in subscribers from the east shore of Okaucbee Lake and the shores of Pine Lake.

SHEBOYGAN, WIS.—The Citizens Telephone Company is conducting some construction work in Sheboygan.

SUPERIOR, WIS.—Among the extensive improvements contemplated by the Douglas County Telephone Company during the coming year may be mentioned the installation of a $40,000 exchange, an overhauling of the entire system and the putting in of new cables and similar work.

WASHBURN, WIS.—The Home Telephone Company has under construction a new line to Barkesdale, which is to take care of the company's increased business in that locality.

EDMONTON, ALB., CANADA.—The Alberta government is making arrangements to at once commence the construction of government owned telephone lines and plans are being prepared for the following long distance lines: Edmonton to Lloydminster, 170 miles; Calgary to Banff, 95 miles; Lethbridge to Le Pass, 110 miles. W. H. Cushing, minister of public works, Calgary, Alberta, is in a position to furnish particulars.

GREENWOOD, B. C., CAN.—The system of the Greenwood Telephone Company is to be greatly improved.

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A Telephone Crossing in Mississippi

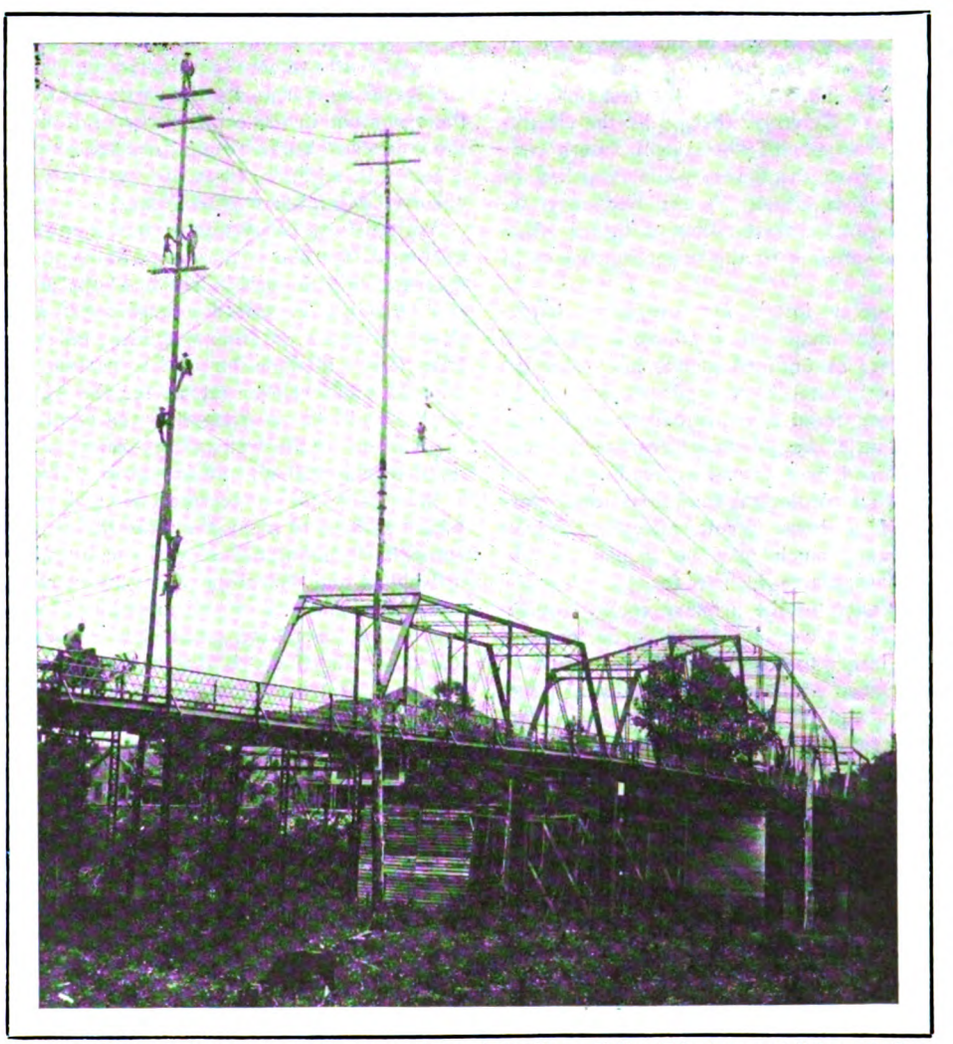
By R. H. Polk.

THE photograph which is reproduced upon this page shows the features of a crossing made over the Yazoo River at Greenwood, Miss. At this point the wires of the Yazoo Valley Telephone & Telegraph Company cross the river to the north side, and although the distance of the span is only moderate, the method of supporting the wires may be interesting to those who have never seen such a crossing, as well as to men who have had similar crossings to make in their own territory.

The poles used for this construction were three 65-foot creosoted pine poles for each mast pole. It will be noticed that two poles are set in the ground at a distance of about 12 feet apart. The tops are brought together and between them is bolted the bottom of the third pole. The poles are guyed in all directions, both at the top and at two points between the top and ground, making a perfectly rigid support.

Twenty telephone wires cross the river, these being No. 12 iron wire. The span is 600 feet between these poles. The height from the ground to the top of the poles is 120 feet, the wires being 15 and 20 feet higher than those of the Cumberland Telephone & Telegraph Company, which are shown on the opposite side of the bridge.

The city desiring to put electric light service on the north side of the river, made a contract with the Yazoo Valley Telephone & Telegraph Company for pole room on this crossing and put five copper wires across. This work was done under the supervision of the manager of the telephone company, Mr. W. B. Williford. It will be noticed from the photograph that a messenger strand is strung over the top of two mast poles from which are suspended supports holding the cross-arms on which the electric light wires are run. The cross-arms for the electric light wires were lined up true from one side of the river to the other and the spans were shortened to about 125 feet each. It was necessary to hang supporting cross-arms from this messenger in order to shorten the spans as the copper would not stand the strain of a 600-foot span.



At the Left of this Illustration Is Shown the Pole of the Yazoo Valley Telephone and Telegraph Company, Which Also Carries the Electric Light Wires.

It will be noticed that the workmen of the electric light works have presented themselves to have their pictures taken when the view was made.

The necessity of having such a high crossing at this point is on account of high water, which frequently rises to within four or five feet of the bridge and clearance must be had for the tall smoke stacks of river steamers plying the river during the high water. The double base poles have timbers bolted across the bottom to prevent their sinking in the mud when the water is high. The 120-foot pole was raised in one piece after it was put together on the ground, and was put in place by a gang of several men. This form of crossing does away with the use of steel towers, frequently used where tall poles are unobtainable.

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Increasing the Range of Transmission

By J. L. Goodwin.

THAT apparatus and circuits at the sub-station may be so designed as to enable the spoken words to be intelligibly transmitted over far greater distances than those ordinarily attained, has been shown by the important investigations of the subject of long distance transmission, conducted by D. M. Therrell, of Atlanta, Ga.

In expressing the results of his attack on this problem from a new point of view, as given in the specification of patents recently issued to him, of which this article is largely an abstract without quotation, Mr. Therrell states the fundamental facts that in the transmission of a simple electrical wave over an electrical conductor of great length characterized by high resistance, electrostatic and conductive leakages, the energy lost or dissipated is proportional to and expressible in simple terms of the reactive constants of the system, and there is no distortion of the wave form. Such, however, is not the case for a complex electrical wave composed of a plurality of coexisting waves, such as the waves involved in the telephonic transmission of the human voice or other sounds composed of a prime or fundamental and an ascending series of partials corresponding to numerous over-tones.

In the latter case each constituent wave of the series is differently affected, and the resultant wave form at the distant end of the line is no longer identical with the form of the wave initially impressed upon the conductor. This is due to the fact that each wave is oppositely, as well as differently, affected by the electromagnetic and electrostatic constants of the system. Both conspire to discriminate in favor of the lower, while retarding or attenuating the upper harmonics directly as the frequency, resulting in the loss of the natural characteristics of speech which are dependent upon the transmission of the upper harmonics or overtones.

While conceding that great losses are properly chargeable to the dissipation of the main-line conductors, owing to their electrical characteristics as outlined above, his researches both mathematical and experimental, have confirmed him in the opinion that, in so far as long aerial lines are concerned, operating under actual conditions, little, if anything, of average and permanent value is to be obtained by a tuning or readjustment of the line constants, owing to meteorological conditions which vary over different sections of a long circuit affecting leakage factors. On the other hand, much may be gained by improving the methods and apparatus in use for the electrical transformation and transmission of the primary energy equivalents of the voice. By reducing the impedance of the primary coil and obtaining thereby larger primary currents, by maintaining a higher mutual inductance and obtaining thereby a higher efficiency of transformation, and by so adjusting the secondary system as to generate a larger line current at a higher effective line potential a higher efficiency of transmission may be effected.

By means of the ordinary transmitter connected in the usual way with primary of an induction coil, it is possible to set up in this primary a current which follows the variations in resistance of the transmitter, and therefore the vibrations caused by the voice.

This current, restricted as it is by the limitations of the transmitter, being of the pulsating type is nevertheless capable of being so transformed as to step up the voltage impressed upon the main line to a value which will cause a current to be perceptible over relatively vast distances. In saying this, however, it must be admitted that such results speak far more for the sensitiveness of the receiver than for the efficiency of transformation or transmission, for although ordinarily we may have flowing in the primary circuit something like .3 of an ampere the maximum value of the current impressed upon the main line is not more than .0001 of an ampere for the lowest frequency, with a far greater loss in transformation for the higher frequencies.

In order to successfully effect the long-distance transmission of speech, the prime requisite must be an increased power or watt efficiency of the system for each and every frequency involved, and particularly for such frequencies as correspond to the overtones of speech characteristics, if the speech so transmitted is to be satisfactorily intelligible.

The power factor of the system is, first of all, dependent upon the amount of energy available in the primary circuit. Unfortunately a very small amperage is available on account of the I^2R loss in the variable resistance portion of the transmitter, which causes the transmitter electrodes to heat, and thus directly affects the transmission to such an extent as to place the available current limit considerably below one ampere. This is not the only difficulty. Long-distance transmission makes it necessary to raise the line potential by transformation. Anything like efficient transformation presupposes a maximum mutual induction. This in turn calls for a high magnetic inductance, which is only possible by the use of iron in the magnetic circuit.

Now there are two paramount reasons why neither of these requisites are admissible in telephony. If it is attempted to increase the magnetic intensity of the coil by the use of an increased amount of iron in the core, a loss which is due to an oversaturation of the core occurs. This results from the direct current used in the primary circuit, which saturates the core and leaves no margin for the variation of the lines of force due to the variations in the primary current following the vibrations of the voice, and hence, results in a loss in the secondary instead of a gain. In addition, there are hysteresis losses due to high frequencies and great magnetic density.

Again, just in proportion to the amount by which the mutual induction of the coil is increased, by an improved efficiency of the magnetic field the self-induction of the primary is also increased, and therefore its effective impedance, which means a proportional reduction of primary current unless the voltage be raised. Even if this be done the primary current is only increased at the expense of the power factor, for the wattless component of the primary will be so great that the point is soon reached where the heating of the transmitter-electrodes makes a larger current impracticable without having improved the efficiency of the system.

This calls for a compromise and also throws light upon what has been to many for years the paradox of the art. In the standard long-distance induction-coil as used by the American Telephone and Telegraph Company, a minimum of iron is used and the coefficients of self and mutual induction are amazingly low. This, of course, means low efficiency; but experience has shown, as stated above, that to attempt a further increase in the efficiency of transformation but invites other losses which outweigh any apparent gains. Hence the standard "cigar-coil" and the attempt to force the problem by attacking the capacity losses upon the main line.

With these difficulties applying to present methods of transmission clearly understood, Mr. Therrell was enabled to proceed with a series of patient and careful investigations which have at last resulted in his discovery of a method of maintaining a high efficiency of transformation in the substation set, without entailing upon the system either the losses due to oversaturation, hysteresis, primary or secondary impedance.

The principles underlying his invention involve a considerable departure from the standard practices of the art, being based upon the laws governing the actions and reactions of the general transformer, their effects upon transformation, and the principles of resonance in relation thereto, which may be briefly stated as follows: A current flowing in a single turn of wire sets up a magnetic field consisting of a definite amount of magnetic flux or number of lines of force forming closed curves around the given conductor. This flux increases and decreases with increase and decrease of current. If the permeability of the medium is constant, the magnetic flux is directly proportional to the current. If there are *s*

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turns of wire instead of one, the flux N passes through each turn, and consequently there are sN lines threading or linked with the circuit. The quantity sN may be termed the "flux turns" or "inductance" of the circuit. If the magnetic induction through any circuit be changed, due to any cause whatsoever, an electromotive force is developed in the circuit proportional to the rate of change of the magnetic induction, as first shown experimentally by Faraday. The change in the induction to which this induced electromotive force is due may be produced by a change in the current flowing in the circuit itself, in which case the electromotive force so induced is dependent upon the rate of change of the current and is known as the "electromotive force of self-induction."

In telephone practice there are two coils in juxtaposition, which are designated as "primary" and "secondary," each with a given number of turns or convolutions. Let there be a current of given intensity flowing in the primary coil. This current in the primary if caused to vary produces a magnetic induction which varies in consonance therewith. Now this induction not only induces an electromotive force of self-induction in the primary itself, but also induces an electromotive force in the secondary, due to the changing lines of force of the primary and the relative position of the two coils, which is proportional to the rate of change of the induction in the primary. This is mutual induction. This mutual induction may be defined as the "ratio" of electromotive force induced in one circuit to the time-rate of change of the current in the other producing it. It may also be expressed in terms of the induction threading the secondary, due to the current in the primary being equal to the rate of change of the number of lines of force linked with the secondary. The effect is greatly increased by the use of iron in the magnetic circuit.

Upon these principles is based the operation of the devices used for changing an alternating or varying current from one potential to another of higher or lower pressure, known as "induction-coils" or "transformers." In order to determine the action between the primary and secondary circuits of a transformer through the medium of their common magnetic field, it is necessary to ascertain the amount of induction due to the current flowing through the turns of the primary and embracing a magnetic circuit of known permeability. This may be readily calculated from the laws of the magnetic circuit. The total magnetic flux or induction N is equal to the magnetomotive force divided by the reluctance. The secondary electromotive force induced by the primary current is proportional to the rate at which the primary current is changing and is equal to this time-rate of change multiplied by the coefficient of mutual induction. In order to abbreviate the expression of principles involved in the invention the following conventions will hereafter be used:

n=frequency or periods per second.
C=capacity.
I_1=primary current.
I_2=secondary current.
E_1=primary electromotive force.
E_2=secondary electromotive force.
L_1=primary inductance.
L_2=secondary inductance.
M=mutual inductance.
N=total flux of magnetic field.
R=ohmic resistance.
Im=impedance.
ϕ=primary phase angle.
Θ=secondary phase angle.
p. p. s.=periods per second.
γ=transformation ratio.

Subscripts 1 and 2 refer to primary and secondary circuits, respectively, throughout this description.

Having acquired the underlying principles of the transformer, one is in a position to consider the diagram of a telephonic high-potential transformer or induction-coil such as is in standard use by the American Telephone and Telegraph Company. Fig. 1 is a polar diagram of such a coil. The solid lines indicate secondary on short circuit, the broken lines the same coil with eight thousand ohms in secondary circuit.

The constants of the coil are taken as follows:

R_1=.5 ohm.
R_2=85. ohms.
L_1=.021 henry.
L_2=.1333 henry.
M=.0529 henry.
n=250 p. p. s.

Each vector is assumed to represent maximum values. For elucidation the state of affairs produced with the secondary on

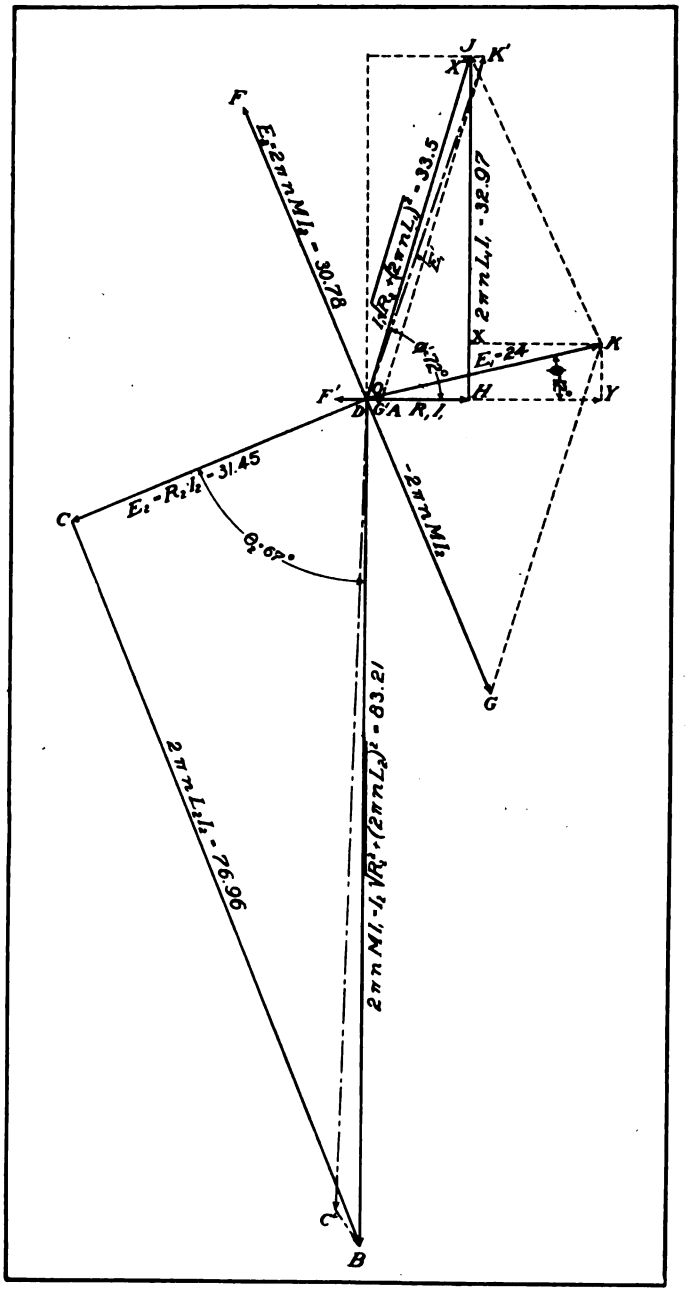

Fig. 1. Polar diagram of standard Bell No. 10 induction coil, having maximum amount of iron core, mutual and self-induction allowable in practice, with secondary on short circuit. Line values not shown on drawing are as follows: O A, 1 ampere; O D, .372; O H, 10. Broken lines show conditions with eight thousand ohms in secondary circuit.

short circuit, and a primary current of one ampere, flowing through an average resistance, including the transmitter of, say, ten ohms, represented by O A and O H, respectively, will first be taken up. It is desired to know what will be the electromotive force and the current in the secondary, how this secondary current affects the primary, what is the primary impedance, and the electromotive force necessary to maintain the given cur-

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rent in the primary. Attacking the problem geometrically, there may be drawn a line O A to represent the value of the harmonic primary current flowing through a circuit of resistance O H and inductance H J. Ninety degrees behind O A is drawn the line O B, equal to

$$2\pi n M I_1 = I_2 \sqrt{R_2^2 + (2\pi n L_2)^2}$$

This line represents the electromotive force induced in the secondary circuit by the primary current. When the secondary circuit is closed, a current flows which acts inductively both upon the primary and secondary circuits. This secondary current lags behind the impressed electromotive force O B in the secondary, due to self-induction, by an angle θ_2, such that

$$\tan. \theta_2 = \frac{2\pi n L_2}{R_2}$$

It is possible to represent the secondary effective electromotive force and current by the vector O C and O D, respectively wherein

$$E_2 = R_2 I_2 \text{ and } I_2 = \frac{2\pi n M I_1}{\sqrt{R^2_2 + (2\pi n L_2)^2}}$$

By the graphical construction for simple circuits it is known that the right triangle O C B upon B as a hypotenuse represents the secondary electromotive forces, O S representing that necessary to overcome resistance$=R_2 I_2$, C B that necessary to overcome the self-induction $2\pi n L_2 I_2$. The relation between the primary and secondary circuits is entirely a mutual one. A current flowing in the secondary induces an electromotive force in the primary, just the same as a current flowing in the primary induces an electromotive force in the secondary. The electromotive force set up by the secondary current in the primary is termed the "back" electromotive force and is ninety degrees behind the secondary current, and equal to

$$2\pi n M I_2$$

Therefore, in Fig. 1 the back electromotive force may be correctly represented by the line O F ninety degrees behind the secondary current O D. Having assumed a primary current, there has now been determined the corresponding secondary electromotive force, the secondary current O D, and the back electromotive force O F. It now remains to find what impressed primary electromotive force is required to cause the primary current to flow. Instead of having but two electromotive forces to overcome, as would be the case for a simple circuit, the primary electromotive force must in this case not only overcome the electromotive force of resistance and self-induction in the primary, but also the back electromotive force induced in the primary by the current in the secondary. The electromotive force to overcome resistance of the primary is always in phase with the primary current and is represented by O H. The component necessary to overcome the primary self-induction is equal and opposite to the electromotive force of self-induction, and is therefore ninety degrees ahead of the primary current and is represented by the vector H J ninety degrees ahead of O A and equal to $2\pi n L_1 I_1$. The triangle O H J is the triangle of the primary electromotive forces when no current flows in the secondary. In such a case the necessary impressed electromotive force upon the primary is O J; but when the secondary current is allowed to flow, as in the case under consideration here, there must be a component of the primary electromotive force to overcome the back electromotive force due to the secondary current. This electromotive force must be equal and opposite to O F and is represented by the line O G, equal to $-2\pi n M I_2$. Having thus developed the diagram, the primary electromotive force desired is easily found, since it is the geometrical sum of the three components O H, H J, and O G. The resultant of O H and H J gives O J, and the resultant of O J and O G gives O K, which represents the required primary impressed electromotive force, being in the case considered about twenty-four volts and leading the current by approximately twelve degrees.

From Fig. 1 it is readily seen that since the component of the primary electromotive force O G necessary to overcome the back electromotive force due to the secondary is in the direction of the primary current O A the effect of a current in the secondary is to divide the primary electromotive force into three components, which apparently reduces the self-induction of the primary and increases its resistance by bringing the resultant electromotive force O K more in phase with the primary current, whereby the primary current is increased and more power thus obtained. To further illustrate this point, reference is again made to Fig. 1. In the case just considered, wherein the secondary of the coil was assumed to be on short circuit, it will be noticed that the electromotive force of self-induction in the primary was apparently reduced by the back electromotive force of the secondary from H J to H X and the resistance increased from O H to O Y, while the electromotive force came quite into phase with the current, thus bringing the power factor nigh unto unity. Now let it be assumed that the secondary has a line in circuit of such resistance that the total secondary resistance becomes eight thousand ohms instead of eighty-five ohms. This is about the equivalent of a two-thousand-mile line. The diagram of the same induction-coil under these conditions is indicated in dot-and-dash lines in Figs. 1 and 2 with prime and second indices. The apparent result is that the secondary electro-

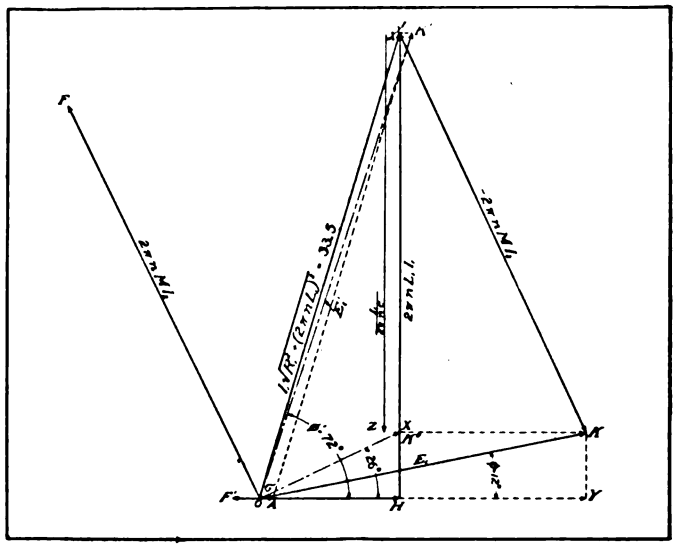

Fig. 2. Enlarged portion of Fig. 1, with eight thousand ohms in secondary circuit, showing method of neutralizing primary self-induction by a capacity reactance.

motive force rises from 31.45 volts to eighty volts, as shown by O C', while the secondary current falls from .37 ampere to .01 ampere, the back electromotive force falls from 30.78 volts to .83 volt, as shown by O F'. The lag in the secondary is also reduced from about sixty-seven degrees to about one degree, with an equal shift in the phase relation of the back electromotive force. The result is shown in the position of O G', with the resultant of O J and O G', which is O K', as the necessary impressed primary electromotive force equal to about thirty-three volts and leading the current by about seventy-two degrees instead of twelve degrees, with a power factor proportionately reduced.

The values of the various vectors just given are based upon the assumption that the primary electromotive force has been raised so as to maintain a power-current of one ampere in the primary and that the power factor of the primary remained the same as when the secondary was on short circuit. In practice it is necessary to deal with a decreasing, or at best a constant primary electromotive force. Under these circumstances, a case where the primary electromotive force is twenty-four volts may be considered. Now, with the voltage remaining constant, the effect of increasing the secondary resistance is as follows: The secondary current is reduced proportionally to the secondary resistance and swings nearly into phase with the secondary electromotive force. The back electromotive force, which is dependent upon the value of the secondary current, decreases with the secondary current, and is advanced by the same phase angle. The

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component of the primary necessary to overcome this back electromotive force is proportionately reduced in value and advanced in phase.

As the back electromotive force decreases in value and advances in phase angle the primary impedance increases in value and the impressed primary electromotive force advances or leads over the primary current by a like angle. In the case given the primary impedance is increased from twenty-four ohms on short-circuited secondary to thirty-three ohms with the external secondary circuit as given, and, what is more important, the phase angle between the primary electromotive force and the primary current is increased from twelve degrees in the first instance to seventy-two degrees in the latter. With the given primary voltage the primary current is reduced from one ampere to .72 ampere, which gives for the secondary electromotive force according to the equation 59.8 volts instead of the apparent eighty volts. The energy of the primary circuit is reduced from 23.47 watts$=E_1 I_1 \cos. \phi$, to 5.33 watts, with a corresponding reduction in the energy of the secondary circuit or main line.

Since the magnetic field, by means of which alone energy is transferred from the primary to the secondary of a transformer, is dependent upon the value of the primary current and its power factor and the secondary voltage is directly proportional to the energy of the magnetic field, it follows that any reduction in the secondary or line current as a result of an increased resistance or length of line causes a corresponding increase in the impedance of the primary, and therefore a reduction in the primary current, which in turn operates to further reduce the secondary or line current by reducing the secondary potential, which is equal to $2 \pi n M I_1$.

Thus it is seen that to the primary impedance and secondary resistance is due most of the inefficiency of telephonic induction-coils or transformers. On account of primary self-induction and hysteresis losses it is impracticable to employ a magnetic field of sufficient intensity to warrant an efficient transformation. On account of secondary resistance—and long-distance telephonic induction-coils may be said to operate on resistances equivalent to open circuit—it is impossible to take advantage of a back electromotive force which further reduces the transformation ratio. This is true to such an extent that the transformer referred to in Fig. 1 shows by computation a loss of about eighty per cent. between the primary and the secondary watt energy, even with the secondary on short circuit; $= E_1 I_1 \cos \phi - E_2 I_2 \cos \Theta_2$.

(To be continued.)

Biblical Texts for Telephone Users

A most valuable addition to telephone literature has been made by a contributor to the New York Sun, who gives the following apt references:

THE COMPANY.—Their line is gone out to all the earth and their words to the end of the world. Ps. xix:4.

TRUNK WIRES.—Thy land shall be divided by line. Amos vii:17.

THE SERVICE.—Prepared for an hour, and a day, and a month and a year. Rev. ix:15.

They were employed in that work day and night. 1 Chron. ix:33.

MONOPOLY.—We have no might against this great company. 2 Chron. xx:12.

Now, shall this company lick up all that are round about us? Num. xxii:4.

THREATENED COMPETITION.—See! There come people down by the middle of the land, another company come along! Judges ix:37.

THE NEW ZONES.—The great city was divided into three parts. Rev. xvi:19.

Charge the people. Exod. xix:21.

A daily rate for every day. 2 Kings xxv:30.

And kept back part of the price. Acts v:2.

"INFORMATION."—Is there any number? Job xxv:3.

I know not the numbers thereof. Ps. lxxi:15.

Search may be made in the book of the records. Ezra iv:15.

He telleth the number. Ps. cxlvii:4.

His number is 666. Rev. xiii:18.

I understood the number. Dan. ix:2.

THE CALL.—When I call, answer me speedily. Ps. cii:2.

I called him, but he gave me no answer. Cant. v:6.

Then they waited according to their order. 1 Chron. vi:32.

Call now, if there be any that will answer thee! Job v:1.

Where is the receiver? Isa. xxxiv:18.

Let every man be swift to hear and slow to speak. James i:19.

Thou didst call me. 1 Sam. iii:6.

THE CONVERSATION.—Call thou and I will answer, or let me speak, and answer thou me. Job xiii:22.

They would not take hold of his words. Luke xx:26.

Ye have heard my conversation in time past. Gal. i:13.

We use great plainness of speech. 2 Cor. iii:12.

Except ye utter words easy to be understood, how shall it be known what is spoken? for ye shall speak into the air. 1 Cor. xiv:9.

Except they give a distinction in the sounds, how shall it be known? 1 Cor. xiv:7.

I had rather speak five words with my understanding than ten thousand in an unknown tongue. 1 Cor. xiv:19.

THE INTERRUPTION.—I said in my haste, "I am cut off." Ps. xxxi:22

There is no speech nor language. Ps. xix:3.

His name should not have been cut off. Isa. xlviii:19.

If he cut off, and shut up, who can hinder him? Job xi:10.

There are so many kinds of voices in the world. 1 Cor. xiv:10.

Thou hearest the sound thereof, but canst not tell whence it cometh. John iii:8.

Put off the former conversation. Eph. iv:22.

I will cut him off. Lev. xvii:10.

A dreadful sound is in his ears. Job xv:21.

The sound of the grinding is low. Eccles. xii:4.

Who hath stretched the line upon it? Job xxxviii:5.

Cut off his branches. Dan. iv:14.

Rebuke the company! Ps. lxviii:30.

Thou and all thy company. Num. xvi:16.

Be damned! Mark xvi:16.

What a word is this! Luke iv:36.

Forget it! Prov. iv:5.

Evildoers shall be cut off. Ps. xxxvii:9.

They went to their own company and reported. Acts iv:23.

THE PARTY WIRE.—Line upon line, line upon line. Isa. xxviii:10.

Both parties shall come before. Exod. xxii:9.

While they are yet speaking I will hear. Isa. lxv:24.

Not to boast in another man's line. 2 Cor. x:16.

PAY STATIONS.—Will they not pay toll? Ezra iv:13.

It shall not be lawful to impose toll. Ezra vii:24.

Thou hast nothing to pay. Prov. xxii:27.

Wherefore kick ye. 1 Sam. ii:29.

Twenty and three Judges x:2.

RAPID GROWTH OF FARMERS' LINES IN WESTERN NEW YORK.

AT a meeting of telephone men representing the companies operating in Genesee County, N. Y., the greatly increased use of the telephone in that section was made evident. The exchange at Elba, which started a few years ago with 16 subscribers, is a good example. There are now 180 subscribers, and the number is constantly growing.

A strong county organization was formed by representatives of lines which give service to seven towns. Officers were elected as follows: President, Henry Norton, Byron; vice president, John Simons, Darien; secretary, G. H. Torrey, Stafford; treasurer, H. E. Stevens, Corfu.

All over New York State the subscribers to rural lines are making arrangements to connect with the Independent exchanges in the larger towns. The organization within a few months of the representatives of many more of these lines in district associations is looked forward to as a certainty. When this is accomplished the State will have a most substantial Independent telephone organization.

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Discipline in the Operating Room*

By Miss T. Barnes.

A HIGH class service in an operating room is the fruit of good discipline. Obtaining good discipline does not imply that the operators have learned a book of rules and passed a satisfactory examination on them. It is not sufficient that they should know what is right; it is the *doing* what is right that brings about good results.

The selection of girls for operators is the first important step. Great care should be taken to know positively that they are of good character, as experience has proven to me that girls of good character are more liable to have the company's interest at heart. In protecting themselves from reproach, they are also protecting the company.

One of the first things for a young woman to learn, who wishes to press into the world's labor market, is its supremacy over all other matters. Very few young women who apply for a position have learned this first and most essential lesson. Unless an operator is willing to recognize the imperialism of business in the telephone world, she is never successful; she invariably grows uneven in her work, half hearted, uninterested and is not regular in attendance or punctual. She soon becomes a disturbing element among operators who obeyed the rules contentedly, previous to her appearance in their midst.

Attendance in any line of work is important, but especially so in the operating room. It is not an easy matter for another to pick up the thread in the loom of business that some one has dropped, and go on weaving the same pattern without a broken thread or perhaps a tangle of threads. Each operator is assigned to a certain position for a stated number of hours of the day. In the course of time she becomes familiar with the wants and peculiarities of many of her subscribers. It has been advocated by other companies that it is not best for an operator to become attached to, or interested in any one position, but I have experimented both ways and find that the way to make an operator become interested in her work and regular in attendance is to assign to her a permanent position and let her become thoroughly familiar with the wants of the subscribers on that position. The importance of attendance can readily be seen when each operator has 150 subscribers that she understands better than anyone else. Complaints of service usually occur on a position where a regular operator is absent. An operator must during certain designated hours become to an appreciable extent a cog in a great machine, an obscure yet not unimportant factor.

After attendance, I consider punctuality next in importance. An operator should be thoroughly impressed with the weight of this rule from the moment she enters the operating room as a student. If the morning finds her longing for sleep right up to the edge of her working hours, she must not allow herself one moment beyond her usual hour for rising. From a strict observance of this rule operators are soon impressed with the fact that until they arrive there is a halt, as they must report for duty in the dressing room at five minutes of the hour. The Chief Operator gives three signals from her desk, beginning at five minutes of the hour, to operators in the dressing room. The first signal at five minutes before the hour is a warning bell; the second signal at three minutes before means to form in line in order of position at switchboard and the third signal at two minutes before the hour, means to pass into the operating room and stand at the right of the operator to be relieved. The Chief Operator then gives three more signals, the first for operators who are to be relieved to pull receiver plugs, step back and form in line to pass out; the second signal is to pass out, and the third signal for operators on duty to draw in chairs and be seated.

If any operator is missing at the second signal in the dressing room, the line is held. If she comes running in at the last minute, all out of breath, and drops into place in line she feels, although not late, that her day is started wrong. If she fails to arrive in time to form in line with the others, she must pass in alone. Nine cases out of ten an operator dreads this ordeal more than any lecture that could be given her; the very silence in the room is a reproach to her. Operators rarely pass in late without walking up voluntarily to the Chief Operator with an explanation. It is not that an explanation sets them right on their deportment card, but it sets them right with themselves. I believe they would rather I gave them a good lecture than for me *not* to say anything. The reproach that silence gives, is often more effective than words.

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If the material, however, has only become dull it is an easy matter to buff it with a regular buffing wheel, or polish it with fine pumice stone. Instrument makers very often use oil with the pumice stone, the object being to grind away some of the surface of the rubber, after which it is necessary to use the buffing wheel to give a high finish.

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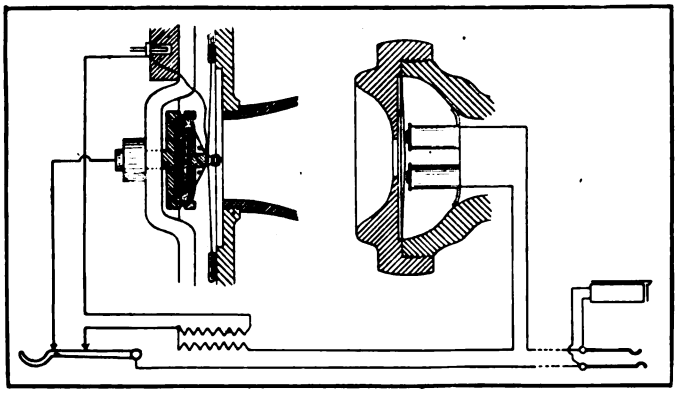
The transmitter diaphragm is started in motion when its mouthpiece is struck with the receiver. As the receiver immediately covers the mouthpiece of the transmitter the effect is to include an irregular column of air which is slightly compressed.

The result is that the diaphragm of the transmitter is forced



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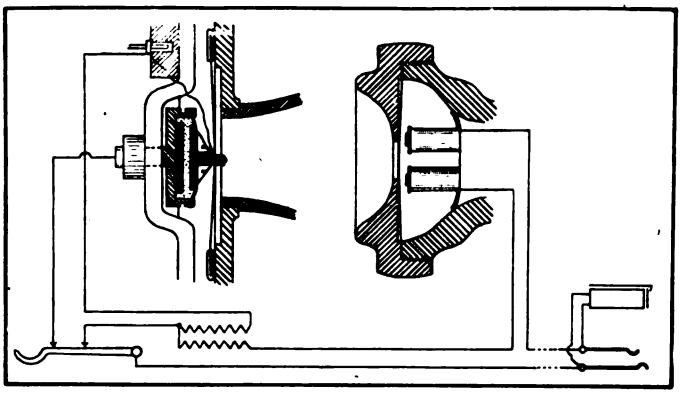

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As the impulse is only momentary the elasticity of the diaphragms causes them to return toward their original position, and in fact they are both carried by the normal position, owing to the inertia which allows them to continue in motion until checked by the tension under which they are held. As the transmitter diaphragm advances the pressure upon the carbon granules is diminished, causing a reduction in the primary current, which again sets up an electromotive force in the secondary. The current in the secondary passes in the direction opposite to that taken by the first current, and its magnetic effect is in opposition to that of the permanent magnets in the receiver. This, by diminishing he pull, allows the diaphragm to bend away from the pole pieces until the condition is as shown in Fig. 741*b*, where both diaphragms are bent toward the openings of the instruments. This action is repeated again and again with great rapidity, resulting in the production of the well-known hum. The energy which keeps the diaphragm in motion is furnished by the battery.

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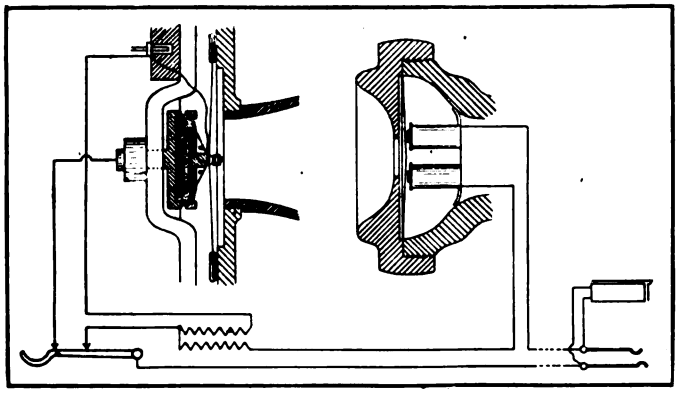

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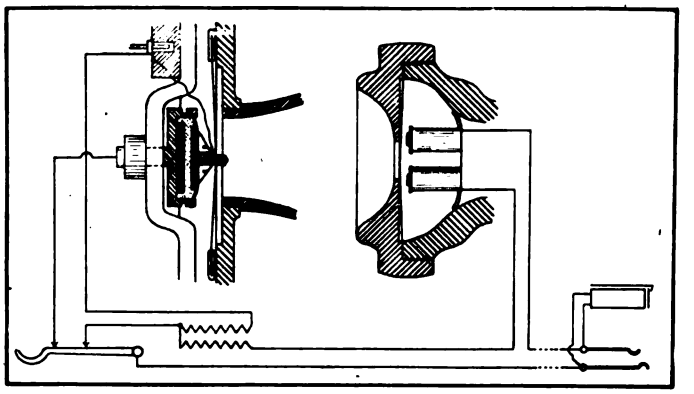

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THE EDITOR'S PAGE

TELEPHONE MEN TO THE RESCUE.

CONSTRUCTION men have many times gone to the relief of residents of the places in which they were at work when an emergency demanded. A recent occurrence in Michigan demonstrates again the great value of the rural telephone, and the story is a novel one.

The horses of a farmer became badly mired, and were slowly sinking out of sight. In desperation the man rushed to his telephone and told his trouble to the manager. A few minutes later a gang of a dozen linemen had been started toward the farm with a rush. As soon as they arrived they hitched up their tackle, and a few pulls with come-alongs brought the struggling horses safely out of the pit to dry ground. There are few days which do not bring out a new use for the telephone.

THE WRONG NUMBER NUISANCE.

WHEN faulty telephone service takes a form which causes a subscriber to do actual work the company may expect the maximum amount of dissatisfaction. From the standpoint of the public, therefore, there is no more annoying feature of poor telephone service than that which compels the subscriber to repeat a telephone number in order to secure the proper connection.

The failure of an operator to correctly understand a number, may, of course, lead to either one of two types of errors. One is the connection of the calling subscriber to the wrong line, and the other the necessity of his repeating the number before the connection is made.

Errors of the first class have been found in service tests to form a comparatively small percentage of the operating errors. Where the time standard for connections is not made too high the subscriber hears the operator repeat the number and, if she has heard incorrectly, calls her attention to the fact before connection is actually established by ringing on the line. If connections are made with too great rapidity, however, the annoyance arising from a single error is especially unpleasant, as it consumes a large amount of time, involves two parties, and sometimes leads to embarrassment when conversation is started. Furthermore it is liable, on busy wires, to bring in another complication, namely, the giving of what are to all intents and purposes false busy reports.

The danger which arises from permitting the second class of errors to occur lies not so much in the seriousness of a single fault as in the frequency with which the fault is liable to be committed. In some exchanges there seems to be a laxness of supervision which results in an utter failure to watch for these mistakes, resulting in their occurrence so often as to be little short of astonishing. Aside from an occasional excusable failure due to poor enunciation by the subscriber there can be but two reasons for the repeating by the operator of a number different from the one which she hears. One of these is poor transmission. In an exchange built by a competent engineer and properly maintained this difficulty need never be experienced. The other cause is a personal one, residing with the operators themselves, coming simply from defective hearing.

The prevention of operating faults due to the latter cause is a thing which may very properly be borne in mind when applicants apply for a position. Men who apply to railroads for certain positions must have their eyes examined, and submit to careful and complicated tests which effectually shut out those whose sight is so poor as to make it difficult for them to distinguish between the lights of different colors which are used for signals. It is no less important that telephone operators should be selected from those applicants whose hearing is nearly perfect. Although the exercise of this sense forms a most important feature of the telephone operator's work it is an unfortunate fact that not only is there very little pretense of testing it, but even a proper and scientific method of making such tests has never been discussed so far as to bring about a general understanding of the subject. It is well worth such consideration, from not only the men interested in the more delicate questions of telephonic theory, but from the most practical operating men.

Even with ordinary conditions much can be done by the careful supervision and testing of service. When operators appreciate the importance of the point they are always willing to make the special effort of attention which is required to bring about an improvement. The main thing is that definite efforts should be made by those in charge of the service to learn how prevalent is this evil, and what particular operators need admonition.

In an exchange where connections are handled by operators who seldom fail to make the proper connection a difference of half a second of time on each call will pass unnoticed. Inaccuracies, however, are a frequent source of complaint, as each one makes a positive and unpleasant impression on the person whose attention is unavoidably directed to the faults committed by the employees with whom he deals most frequently.

LONG DISTANCE TRANSMISSION.

ATTACKING the problem of increasing the distance over which voice currents may be projected with transmitters of the ordinary type, with a view to increasing the efficiency of the sub-station equipment, D. M. Therrell has obtained some most interesting results, the discussion of which is begun in another section of this paper.

His work involved a careful mathematical investigation of the induction coil as a transformer which brought out the statement of a number of features which have operated to prevent the furnishing to the line of a current adapted to overcome those natural characteristics which reduce the strength of the current and distort the wave form. These results, checked by experiments, made it possible to arrive at conclusions concerning the requirements of a system which would permit of the transformation of the primary current at an efficient ratio. It is stated that this can be brought about by neutralizing the self-induction of the primary circuit for any desired frequency, thus making this circuit independent of the secondary current, which under the present arrangement produces undesirable primary reactions. The accomplishment of this result greatly increases the primary current, which in turn produces a higher electromotive force in the secondary.

The particular method of neutralizing the primary impedance which is recommended is the introduction into a branched primary circuit of sufficient capacity and inductance to satisfy the conditions of resonance for a selected frequency. The method of determining the proper amounts of capacity and inductance to be introduced in the primary circuit is given as a part of the discussion of the problem.

The device by which the primary current is made alternating in character, in order that the required condition of resonance may be obtained, represents a distinct and novel step in the art. The practical application of the principles which have been developed in Mr. Therrell's invention, if it produces the results which are expected, will be a most fitting culmination of a series of patient and skilful investigations.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

DISCONTINUANCE OF SERVICE FOR FAILURE TO PAY RENTAL.

Some time ago we discontinued the service of one of our subscribers at the end of our quarterly period, because said subscriber refused to pay for telephone service in advance, in accordance with the rules and customs of this company. This party has entered suit and has caused a writ of mandamus to be issued to compel us to give him service. We will thank you to quote us authority and decisions on similar actions throughout the United States. E. D. S.

A RULE that telephone service must be paid for in advance, and, if not paid for, the company's instruments will be removed, is reasonable, and one that the company has a right to enforce. Teleg. Co. v. McGuire, 104 Ind. 130, 2 N. E. 201; Water Co. v. Wolf (Tenn.) 41 S. W. 1040; Frothingham v. Benson, 44 N. Y. S. 879; Brass v. Rathbone, 153 N. Y. 435, 47 N. E. 905. Keeping in view the public nature of the company's duties and the service it may be compelled to render, it has been held that the company may enforce the payment of its current dues by the summary method of denying service regardless of the fact that the subscriber claims the company is indebted to him. Rushville Cooperative Co. v. Irvin (Ind.), 59 N. E. 327. In the last case mentioned, the subscriber offered to pay in unpaid labor claims which the company refused to accept and the court denied a mandamus to compel the reinstallation of his telephone. In the following cases it has been held that connection can be compelled by mandamus. Telephone Co. v. State, 118 Ind. 194, 123 Ind. 113; State v. Nebraska Telephone Co., 22 N. W. 37, Cumberland Telep. & Teleg. Co. v. Hendon, 71 S. W. 435. Central Co. v. Fehring, 146 Ind. 189.

INJURY TO LINEMAN FROM LOOSENED STEPS.

SUIT was brought against an electric company by a lineman for injuries received from falling from a pole. He charged that the company was negligent in not using a suitable step on its poles, and that the spikes of the steps were not properly driven in the poles. He testified that the superintendent promised a year before the accident to take out all driven spikes and substitute screw spikes, but admitted that, at the time he was hurt, driven spikes were in the poles. He also admitted that it was his duty if he found a pole where a step was loose that he could not repair himself, to report it and did so report it. The court directed a verdict for the company and was sustained by the Supreme Judicial Court of Massachusetts, the decision being that the employee was not in the exercise of due care when he placed his weight on a step without first ascertaining whether it was loose.

Little v. Hyde Park Electric Light Co., 77 N. E. 716.

DOUBLE TAXATION.

AT Frankfort, Ky., it has been decided by Acting Police Judge Hamilton that the East Tennessee Telephone Company has been subjected to double taxation by paying for its franchise and also paying a franchise tax. The city of Frankfort procured a warrant against the company for conducting its telephone business without having first procured a license under a city ordinance imposing a license fee of $50 per annum for the privilege of conducting a telephone business in the city of Frankfort. The company paid annually to the city taxes on its franchise to the amount of $50. The city contended that the company never purchased a franchise, but the court held that the collection of the franchise tax estopped the city to deny that the company was without a franchise. The court held that a franchise tax and a license tax was identically the same thing and that an imposition of both upon the company amounted to double taxation, contrary to section 171 of the state constitution, which provides that all taxes shall be uniform upon all property subject to taxation. The court cited the cases of Cumberland Tel. & Tel. Co. and Louisville and Nashville R. R. Co. v. Hopkins, 28 Ky. Law Rep. 841. The warrant was dismissed and judgment rendered for the company.

PROPER PROTECTION AGAINST LIGHTNING.

Ours is a ground return system in the State of Kansas. We are not troubled by any electric wires other than telephone wires, and find that ordinary lightning protection has a tendency to put any line out of commission until we can get a lineman far into the country to replace the fuses and clean the carbons. The tendency is to use a wide gap and no fuse at the substation. Does this practice lay us liable to damage in case of suit, and what must we do to be safe, not from lightning, but from State law? J. E. L.

TO be safe from State law, a telephone company, having reasonable grounds to apprehend that lightning will be conducted over its wires into a house where it maintains an instrument under contract with a subscriber and then do injury to persons or property, must exercise due care in selecting, placing and maintaining in connection with its wires and instruments such known and approved appliances as are reasonably necessary to guard against such accidents, and for failure to do so will be liable for such damages as naturally result from its negligence. Griffiths v. New England Telephone & Telegraph Co., 72 Vt. 441, 52 L. R. A. 919. If the protection you are using is the ordinary method, and is a known and approved appliance, you would not be liable for damages in case of suit. The question itself of whether your protection was such as is reasonably necessary for the purpose would have to be determined in the suit itself.

TEST OF FRANCHISE REPEAL AT MOLINE, ILL.

THE Central Union Telephone Company has secured a temporary injunction in the United States Court at Springfield, Ill., restraining the city of Moline from preventing the company from taking possession of its new exchange building. The bill of complaint filed by the company shows that the city passed an ordinance July 20, 1885, giving the company the right to build and maintain a telephone system in Moline, that the company accepted this ordinance, filed articles of incorporation and has constantly maintained its system in the city since. On April 2, 1903, the city passed an ordinance repealing the company's franchise, but this repealing ordinance was not published as required by law in a newspaper in Moline. The company was prepared on January 1, 1906, to occupy its new exchange building modernly equipped, but has been repeatedly restrained by the city under the Mayor's order, and the Mayor has threatened criminal proceedings against the company if it disobeys. The petition further states that the city has commenced suit against the company to recover a pole tax assessed by ordinance last fall, and that while the company denies the validity of the tax, the city is estopped from asserting that the company has no franchise, because it is suing the company to recover a tax on poles, which the city claims the company has no right to maintain.

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IN THE OPERATING FIELD

NEW YORK INDEPENDENTS TO HOLD CONVENTION AT NIAGARA FALLS.

A MEETING of the executive committee of the New York State Independent Telephone Association was held at Power's Hotel, Rochester, on Friday, July 27, to decide on the place of meeting of the convention for this year, and to appoint a secretary to act in place of Mr. Lane, former secretary, who has resigned.

R. Max Eaton, of Niagara Falls, was appointed secretary.

Niagara Falls was decided upon as the place of meeting for the convention. The date was left to the decision of the president of the association, and will be announced as soon as it has been determined.

It is anticipated that the largest attendance in the history of the association will be at Niagara Falls on account of the natural attractiveness of the city.

Manufacturers who desire to send their representatives or have exhibits of apparatus at Niagara Falls may communicate with Mr. Eaton, the secretary, at Niagara Falls, for any information they may desire.

COMPLETE MODERN SYSTEM TO BE BUILT AT KEOKUK, IOWA.

PLANS have been completed for the new telephone system which the Mississippi Valley Telephone Company is to build at Keokuk, Ia. Nearly $100,000 will be expended on the new work, which includes the construction of a building, the placing of underground conduits, and the installation of a high grade switchboard with a capacity of 4,800 lines. W. B. Burke, general superintendent of the company, will have charge of the building of the system.

OHIO STATE UNIVERSITY INSTALLING BRANCH EXCHANGE CONNECTED WITH INDEPENDENT LINES.

IN Columbus, O., the Ohio State University is now having installed a branch exchange with trunk lines to the main office of the Columbus Citizens' Telephone Company. Although only thirty-six stations are provided at present, there will be capacity for one hundred in order to provide for the growth which is expected to occur within a short time.

The new telephone system will have stations in various buildings and in the president's office. It is expected to assist in the administration of the University in many ways, as the buildings are somewhat widely separated on a large tract of ground.

COURT DECIDES THAT PATRONS OF TELEPHONE COMPANY CAN LEND SERVICE.

THE question of the right of a patron of a telephone company to grant to a friend or neighbor the privilege of using his telephone arose in a suit pending in the Federal Court at Memphis, Tennessee, in which Julius Hohenempser asked damages for injury sustained while endeavoring to release George Wright from injury through an electric current which caused the latter's death. Wright stopped in a suburban grocery store and asked to use the telephone. The privilege being granted, he took the receiver in his hand and was immediately overpowered by an electric shock. Hohenempser, who was in the store, hastened to cut the telephone wires and received severe injuries to his hands.

The defense was that neither Wright nor Hohenempser had the right to use the telephone. The plaintiff endeavored to establish before the jury that it was the custom in Memphis for citizens generally to use telephones belonging to others whenever convenience suggested their use. One witness was asked the question, "Do you allow neighbors to use the telephone in your house?" The question was objected to and the judge said: "Probably the witness is like a friend I used to know whose neighbor when troubled with neuralgia appealed to him for brandy, which seemed the most effective remedy. The neuralgia became more frequent, and the brandy began to get low in stock. My friend did not want to see a neighbor suffer and would contribute the brandy, but finally patience was exhausted, and when the supplicant had left one day, remarked: "I guess I have to be neighborly, but damn him and his neuralgia." The judge then overruled the objection and thus held that a citizen who by consent uses the telephone of another is not a trespasser upon the rights of the company.

The court later directed a verdict for the defendant on the ground that the telephone which Wright had attempted to use was out of order and the company should have had reasonable time to correct the service before it was used by anybody. The telephone had been reported out of order in the morning about nine o'clock and the injury occurred two hours later.

INDEPENDENT SERVICE WANTED AT WATERTOWN, WISCONSIN.

REPRESENTATIVES of the Independent Telephone Association of Wisconsin recently held a meeting at Watertown. Among other things discussed was the advisability of establishing an exchange at that place. The rates of the Bell Company are so high that development has been retarded, and the people want an Independent system. Those present were Richard Valentine, Janesville, president of the association; Charles Schuenke, Sun Prairie; A. M. Webb, F. N. Sontag, J. A. Hagemann, Fort Atkinson, and J. C. Harper, Madison.

ADDITION OF RURAL LINES TO SYSTEM AT SYRACUSE, N. Y., ENLARGES LIST OF INDEPENDENT SUBSCRIBERS.

RECENTLY the Syracuse Independent Telephone Company completed a new line to North Syracuse, and another to Fayetteville. These lines will furnish means for giving connections with subscribers in the city of Syracuse to about 150 farmers, who are connected to rural lines at the present time.

The line which is being built between Syracuse and Binghamton will make connections with many other farmers' lines, which cover a considerable extent of territory and have many subscribers. Independent franchises are said to have been secured in every town in Onondaga County, and soon the company will have this territory completely covered with a network of wires. The Weedsport, Jordan & Elbridge Telephone Company, which is affiliated with this concern, now has over 200 subscribers, and increases throughout the entire system are being rapidly made.

MANY FARMERS CONNECTED TO THE EXCHANGE AT KENTON, O.

OF the 1350 subscribers connected with the exchange of the Kenton Telephone Company, at Kenton, O., 425 are farmers. Although the company started in business before the development of first class apparatus, nearly all of the old style instruments have been replaced by those of modern type. The result is that the service is most excellent, and has won for the company the hearty support of all its subscribers.

A very satisfactory financial condition has been attained, and at the last regular quarterly meeting of the directors a dividend of 2 per cent was declared. The manager's report shows that telephones have been installed at the rate of 25 per month during the past quarter, and there is no abatement in the demand for service.

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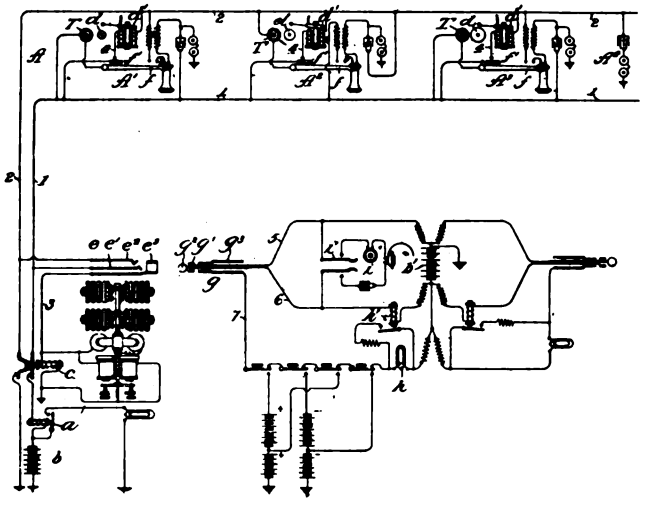
TELEPHONE PATENTS

SIGNALLING SYSTEM FOR PARTY TELEPHONE LINES.

James L. McQuarrie, South Orange, N. J., assigns to Western Electric Company, Chicago, Ill., patents (No. 822,466; dated June 5th, 1906; original application filed January 29th, 1903; serial No. 149,969; divided and this application filed December



10th, 1904; serial No. 236,268) a signalling system for party telephone lines.

This invention has for its object to provide an arrangement whereby the central office operator upon making a connection with a party line in response to a call may readily ascertain the particular subscriber calling. This is accomplished by the provision at each substation of a signalling device which is operated in connection with the movement of the hook switch. In the diagram the party line A extends in two limbs 1 2 from the four substations A^1 A^2 A^3 A^4 to the central office; and thence through the contacts of a cut-off and line relay as usually provided. The substation apparatus is in general similar to that used in central energy line instruments, except that each station is equipped with a signal producing device, such as a single stroke bell *d*, located adjacent to the transmitter, having an operating magnet *d'* included in a bridge 4 of the line circuit controlled at a normally open special contact *f'* of the telephone switch *f*.

The bells at the different stations may have different tones so that the operator may recognize the characteristic signal of any particular one of the substations. Each of the signalling devices at the substations is arranged to be unresponsive to battery *b* normally connected to the line, but is adapted, when the telephone at any substation is removed, to be operated upon the closure of the connection switch by current from battery *b'* associated with the cord strands. A signal receiving device *i* is also associated with the cord strands, by means of which the operator may receive a distinctive signal, indicating the substation at which the telephone is in use. This device consists of a telephone set of the usual type.

TELEPHONE SIGNAL.

A. V. R. Fechtenburg, New York, N. Y., patents (No. 818,675; dated April 24, 1906; filed December 8, 1904; serial No. 235,968) a telephone signal.

The object of this invention is to provide a means whereby the inconvenience of holding the receiver to the ear while awaiting a reply from a distant station may be eliminated. This the inventor accomplishes by means of an auxiliary hook switch which is so designed that when moved up and down a shunt path around the transmitter is made and broken.

In operation, when one party has to leave his telephone both parties place their receivers on the auxiliary hooks. When the party who left his telephone returns and removes the receiver from its temporary resting place, the simultaneous make and break of the shunt circuit causes an induced current of a similar character to flow in the line circuit, thereby creating a noise in the distant receivers and attracting the attention of the waiting person.

LOCK-OUT SYSTEM.

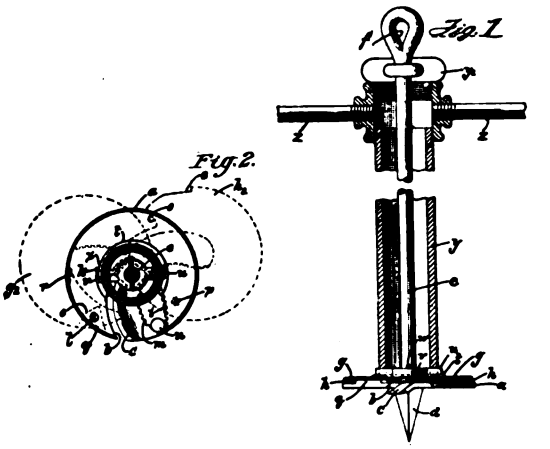
Louis A. Schmidt, Chicago, Ill., patents (No. 818,793; dated April 24, 1906; filed August 21, 1905; serial No. 274,980) a lock-out telephone system.

The object of this invention is to provide a lock-out system which will prevent listening in upon the circuit when it is busy, and which shall be under the control of the operator. Each station is provided with a pair of relays which operate to prevent parties, other than the one desired, from connecting their telephones across the circuit.

ANCHOR.

Clarence E. Cook, Chicago, Ill., patents (No. 825,587; filed October 19, 1905; serial No. 283,544) and assigns to Frank B. Cook, Chicago, Ill., an anchor.

The anchor described is of the type which is intended to be screwed into the ground and then "set" by means of a key or wrench operated from the surface. An elevation of the anchor is shown in Fig. 1. The disc *a* is cut away at *b* and is provided with the sharpened edge *c* which cuts into the earth and, acting as an auger blade, forces the anchor downward when it is rotated in the proper direction. The wrench, *y*, is shown in sec-



tion. It is essentially a pipe large enough to clear the eye *f* fitted with handles *z z* at its upper end, and carrying at its lower end a pinion which meshes with teeth in the two extension blades *g* and *h*.

To install the anchor the wrench, *y*, is adjusted and the point, *d*, is driven into the ground until the disc *a* reaches the surface. The anchor is then turned by means of the wrench until it reaches the desired depth, when the wrench is turned in the opposite direction, causing the blades to spread and be forced into the solid earth.

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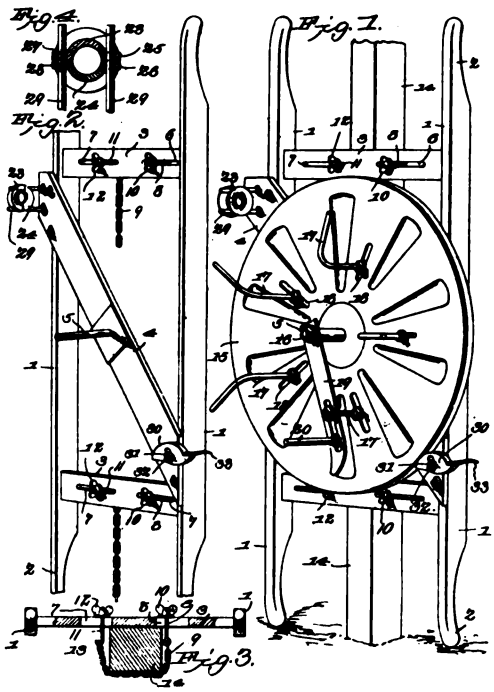
TELEPHONE PATENTS

WIRE REEL.

Walter E. Eichhoff, Cairo, Ill., patents (No. 824,490; dated June 26, 1906; filed October 4, 1905; serial No. 281,335) a wire reel.

The object of the inventor is to provide a truck or carriage for the support of a reel either in an upright or horizontal position



according as the device is being used to pay out or take up the wire.

The complete reel is shown in Fig. 1. In Fig. 4 is shown the frame of the reel, which is provided with slots, 7, in the end bars. Referring now to Fig. 3 the arrangement for holding the reel to poles of various sizes by means of chains and bolts through the slots, 7, is at once clear.

On the diagonal bar 4, Fig. 2, is the shaft, 5, which carries a reel, 15. A guide for the wire is shown at 23. A brake, 30, is provided, which is held firmly on the bolt, 31, by the thumb-screw, 32. When wire is being wound on the reel the brake is adjusted in the position shown and keeps the coil from unwinding. If the wire is to be unwound the brake is turned and the spring end, 33, is brought into contact with the wheel, thus serving to retard its motion.

TELEPHONE SWITCHBOARD.

William E. McCormick, Chicago, Ill., patents (No.824,431; dated June 26, 1906; filed August 26, 1901; serial No. 73,365) and assigns to the International Telephone Manufacturing Company, of Chicago, a telephone switchboard.

This invention covers the design and arrangements, including the circuit wiring of a combined jack and drop of the "express" type. One object is to secure a structure in which single units may be readily mounted in and removed from the switchboard without soldering or unsoldering connections. The drop is composed of a solenoid, within which moves a plunger, normally held in position by a spring. The act of ringing causes the solenoid to be energized and attract the plunger, thus throwing the drop shutter. In its downward motion the latter forces a properly shaped cam against the plunger, which closes the night bell contacts. The operation of inserting the plug acts upon this cam in such a way as to cause it to release the night bell plunger and restore the drop shutter to its normal position.

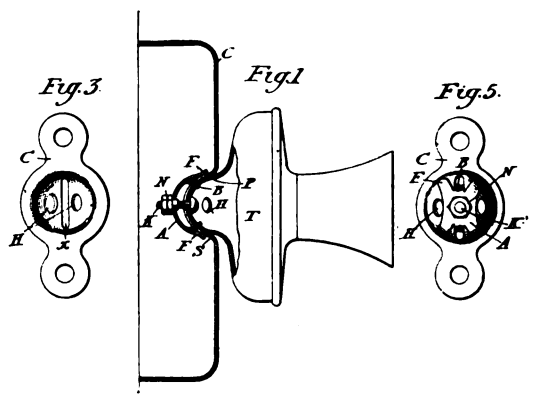
As connections between the line and the jack are made by means of metallic plungers engaging with plates in the switchboard the only operation necessary to detach a unit set, consisting of a drop and jack, is to loosen the two thumb screws and withdraw the apparatus. An ingenious arrangement of parts provides also for the separation or assembly of the various portions of the drop without the use of tools.

TRANSMITTER SUPPORT.

Sidney A. Beyland, Elyria, O., patents (No. 827,579; dated June 19, 1906; filed Feb. 28, 1905; serial No. 247,683) and assigns to the Dean Electric Company of Elyria, O., a transmitter support.

This invention relates to transmitter supports for instruments of the type where the transmitter is carried on a very short arm on the front of the casing or box and yet must have a certain range of movement to adapt it to persons of different heights. It consists essentially of a ball and socket joint with spring take up and a single securing bolt, the socket being formed in a sheet metal plate, which may or may not be a part of the front of the containing case. The "ball" may be either a solid casting adapted to be secured to the shell of the transmitter or else formed up out of the sheet metal itself.

To hold the transmitter in place the bolt *k* passes through the slot *x*, and while it supports the transmitter allows it to be moved in a vertical plane. The spring A has fingers B, which are turned in to pass through the slot above and below the bolt and with their ends lying in openings in the ball or stub of the trans-



mitter. The fingers F extend out over the surface of the socket wall and press more or less as the bolt K is turned up more or less in adjustment after assembling. Sufficient friction is thus assured to hold the transmitter at any angle to which it may be set in use, while the fingers B serve as guides to make the only possible motion a vertical one, as they must move in the slot *x*.

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

THE TELEPHONIC REPRODUCTION OF THEATRICAL ENTERTAINMENTS.

TRANSMITTERS for use in connection with theatrical work and entertainments are said to have been supplied in considerable numbers recently by the International Telephone Manufacturing Company, of Chicago, Illinois.

The transmitters are mounted on a phonograph, or are used to transmit vocal or instrumental music or other audible entertainment to distant receivers, which are placed in various locations throughout the hall or theatre. One of the recent theatrical outfits, which was built especially for a troupe from Paris, France, traveling through Europe, consisted of a transmitter mounted on a small case, provided with four cut-in keys. To each key will be connected a receiver made to respond to unusually strong currents, and provided with a megaphone. These receivers will be concealed in draperies in different parts of the theatre.

The transmitting instrument will be located back of the scenes in a sound-proof booth, from which the songs, instrumental music and other entertainment will be given. By means of the cut-in keys the circuit may be switched so the sound comes from different parts of the theatre at different times, or that it may come from all directions at once, as desired.

Although difficulty has been experienced in the manufacture of equipments of this kind from the tendency of the transmitter to "fall down" after a short time, this obstacle is said to have been overcome in the "International" transmitter, which, it is claimed, will stand up under 15 or 20 cells of battery without "frying," "sizzling" or producing discord, and will not "pack" nor "go dead."

THE BLAKE SIGNAL & MANUFACTURING COMPANY, 246 Summer street, Boston, Mass., furnished 40,000 of the Blake insulated staples to the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., for use on telephone wires in its handsome Public Service Building, which has recently been completed. The selection of these neat and convenient wire fasteners for one of the newest and finest buildings in the country indicates that their worth is becoming widely recognized.

THE SOUTHWESTERN ELECTRIC SUPPLY HOUSE, of New Iberia, La., is prepared to furnish material for telephone and general electric work. This company is being managed by R. F. Hogsett, who has for the past fourteen years been in the telephone business at New Iberia. His knowledge of what is best in the way of material, acquired by practical experience, should insure satisfaction to customers in the telephone field.

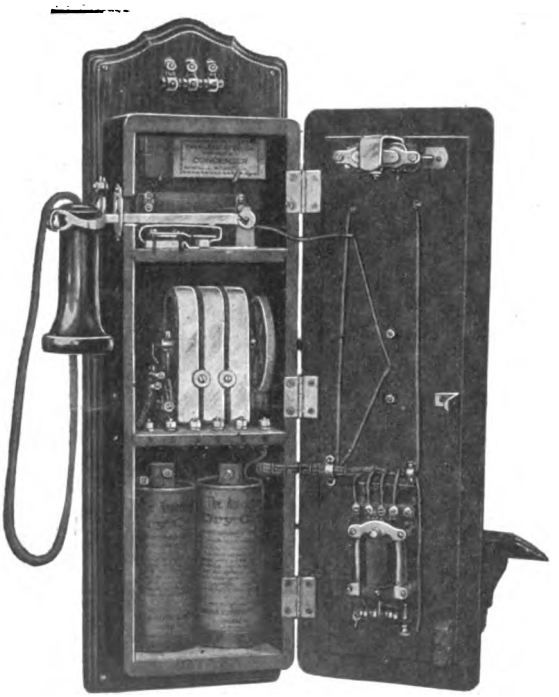

Fig. 1. Telephone equipped for selective service on 8-party line, Zabel system.

THE ZABEL 8-PARTY SELECTIVE SYSTEM.

THE system which provides for the ringing of any individual bell on an 8-party line without calling any of the other subscribers, which is being put on the market by the American Electric Telephone Company, of Chicago, presents a number of interesting features. The principle on which it is based is, in the first place, the division of the eight stations into four groups of two each. This is accomplished by the installation in each subscriber's instrument of a circuit controling polarized relay. Two pairs of relays are connected to each side of the line. One pair is adapted to operate under the influence of positive battery current; the other with negative current.

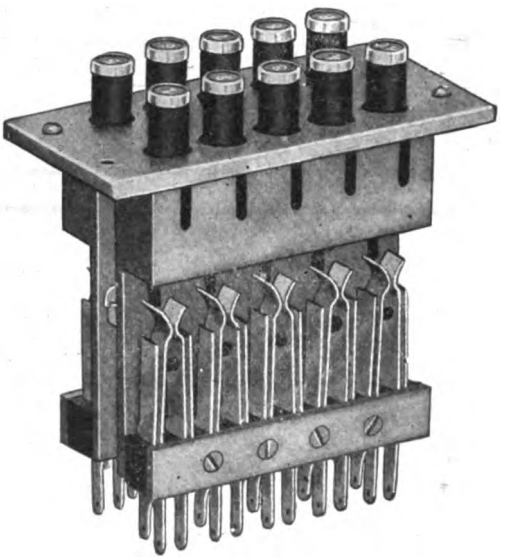

Fig. 2. Eight-party ringing key used with the Zabel selective system.

The bells are normally on open circuit, but the operation of a pair of relays, due to the projection of current of proper polarity over the side of the line to which they are attached connects the bell at one instrument between the tip side of line and ground, while the other is connected between the sleeve side and ground. The operation of the relay (Fig. 4) has at this time been effected by the depression of the proper plunger of the gang key (Fig. 2), one pair of springs in which is so wired as to connect a lead of proper polarity from a special battery in the central office to the desired line wire. The other side of this key is wired to throw alternating current to the proper side of the line. In this way it will be seen that the selection is accomplished by the depression of a plunger in the gang key, which remains locked in position while the operator rings with the ordinary key associated with each cord circuit, when alternating current passes out to a single bell. In the gang key there are two extra plungers, one of which is used to ring on metallic "special" lines, and the other releases the locking mechanism for the selecting plungers.

To avoid any tap in bells connected to the side of the line opposite to the one carrying a bell through which ringing current is passing, and to prevent noises from being communicated to the line from ground, a retardation coil (Fig. 3) is used at each station. As an additional refinement this coil is made adjustable by a simple method, so that any desired impedance within certain limits may be obtained. This system is not only installed in new instruments, but may be readily adapted to instruments of the ordinary type for half of the telephones on an 8-party line. By installing four new telephones on such a line, and putting in the small signal case, containing only the relay and retardation coil, as shown in Fig. 5, the lines may be equipped for 8-party selective service. In equipping an old system in this way the amount and style of additional central office apparatus to be installed is, of course, the same as in a new exchange.

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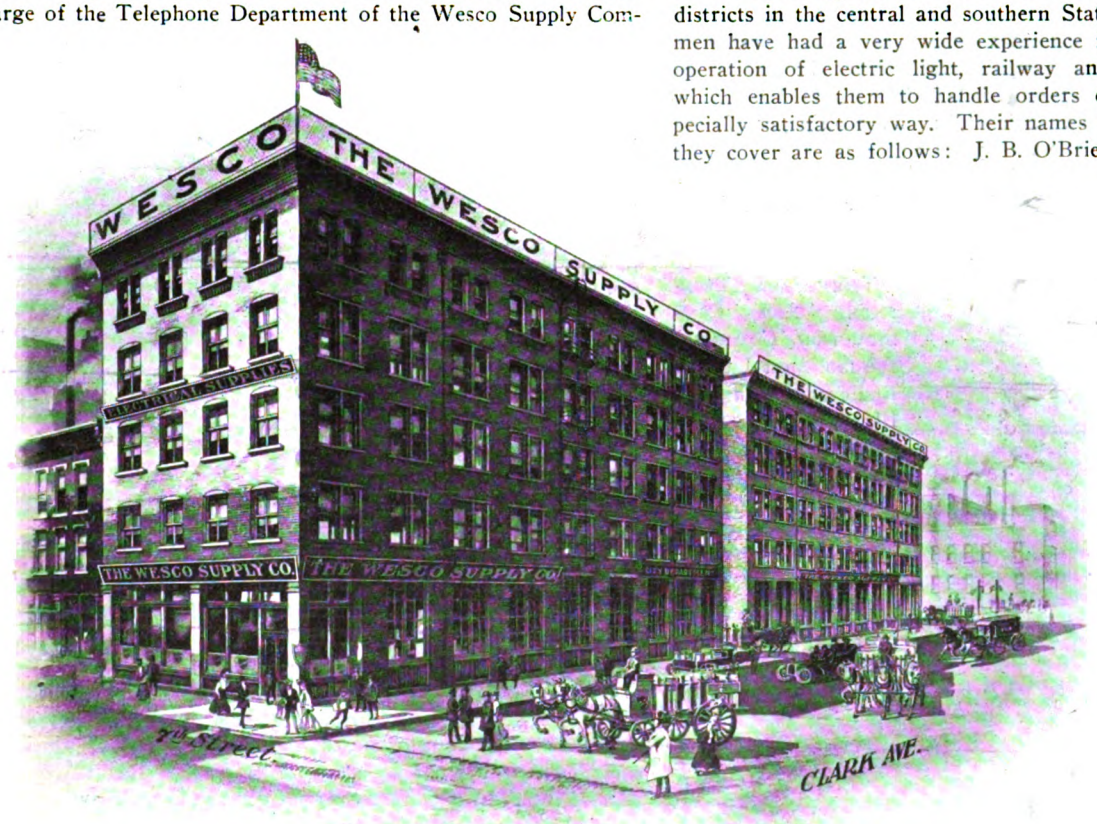
The Wesco Supply Company

SINCE its incorporation in August, 1903, when it took over the electrical supply business of the Western Electric Supply Company, the Wesco Supply Company, of St. Louis, has advanced at a remarkable rate. At the time of the World's Fair the company furnished very large quantities of material for electric lighting and telephone work and electric railway supplies to the management, exhibitors and concessionaires of the fair. Since then business has been increasing at such a rate that it was found necessary, in order to secure efficiency in management, and to enable the details to be looked out for in the careful manner which the company considers so essential, that the business should be looked out for by sub-dividing the company's force into departments. The officers of the company are: C. R. Scudder, President; R. V. Scudder, Vice President and General Manager; A. M. Wood, treasurer.

Each class of business is handled in a separate department. The list of these departments, with the men in charge, is as follows: Charles Scudder, Jr., Manager Country Sales Department; W. W. Moore, Manager Apparatus and Specialty Department; H. P. Didriksen, Manager Telephone Department and Advertising; D. L. Monjo, Manager Street Railway and Mining Department; J. D. Raymond, Manager Lighting Supply Department; F. B. Phillips, Manager City Sales Department; W. L. Moase, Purchasing Agent; H. W. Buecker, Superintendent Operating Department.

Mr. Didriksen, Manager of the Telephone Department and Advertising, has had a wide experience in the field, having been for several years engaged in similar work in Chicago. He took charge of the Telephone Department of the Wesco Supply Company on the 1st of October, 1905, and since that time has made himself thoroughly familiar with the requirements of the people who have contributed to so considerable an extent toward the upbuilding of the business of the company. This company covers the electrical field so thoroughly that it would be hard to find a branch of the electrical industry for which it is unable to furnish material. Moreover its business is so large that it claims an important advantage which comes with the possession of large capital and storage capacity, namely its ability to make prompt deliveries. The illustrations presented upon this page will show the size of its principal offices and warehouses in St. Louis, and also at Fort Worth, Texas. Besides the building shown the company has another large warehouse at St. Louis. By maintaining the house in Texas the company is able to make quick shipments of material to all points in the South and Southwest. This house is in charge of Mr. V. E. Raggio, who was for a long time connected with the General Electric Company. Having travelled over the State of Texas for a number of years he is known to every buyer of electrical supplies in the State. In addition to the exceptionally large working and office force which the company maintains, there are also eleven travelling salesmen, who cover all of the more important districts in the central and southern States. A number of these men have had a very wide experience in the construction and operation of electric light, railway and telephone properties, which enables them to handle orders of customers in an especially satisfactory way. Their names with the districts which they cover are as follows: J. B. O'Brien and N. J. Roth, Missouri; A. W. Woleben, Alabama, Missouri and Eastern Tennessee; P. A. Janis, Southern Illinois, Kentucky and Western Tennessee; F. A. Brooks, Central and N. Illinois; E. E. Rines, Nebraska, N. Dakota and S. Dakota; J. C. Ecoff, Kansas; F. V. Cook, Oklahoma and Indian Territory; A. B. Coon, Colorado, Arizona, New Mexico and Mexico; A. T. Eagan, Utah, Idaho, Montana, Oregon and Washington; P. Clegg, Arkansas and Louisiana.

Warehouse of the Wesco Supply Co. at Fort Worth, Texas.



Main Warehouse and Offices of the Wesco Supply Co. at St. Louis, Mo.

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The company gives, in its Bulletin No. 23, a very complete description of its apparatus. Details of construction and wiring are gone into so thoroughly that the operation of the system may be readily understood. A general discussion of the features of 8-party selective service as an investment is also included. This bulletin may be obtained by writing to the company.

THE W. G. NAGEL ELECTRIC COMPANY, Toledo, O., reports that the demand for the Swisher marline cable hangers, which were put upon the market at a comparatively recent date, has been rapidly increasing. At first the broad claims for the advantages of this type of hanger created some skeptical feeling, but those who have used it are now convinced that the confidence of the company in its value was justified. Descriptive matter, showing how this hanger assists in securing high-class construction and genuine economy in aerial cable work, can be secured from the company.

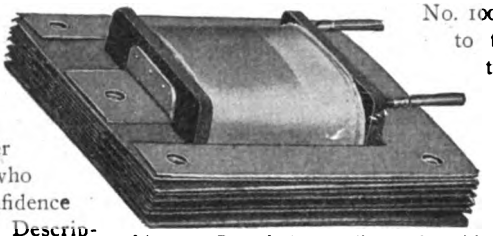

Fig 3. Retardation coil used with Zabel 8-party telephone.

FRANK B. COOK, 240-244 West Lake street, Chicago, reports a large and increasing demand for the 15 types of pole cable terminals that he manufactures. One of the large recent orders was from Portland, Ore., where 800 of the T. 8 terminals were required. Other exchanges that have recently ordered protective equipment are those at Oakland, Cal.; Seattle, Wash.; Morgantown, W. Va.; Kingman, Kans.; Cherokee, Ia.; Chadron, Neb.; Wilmington, Del.; Macon, Mo.; Hazleton, Pa.; Grand Rapids, Mich.; an addition of 600 pairs at Columbus, O., and others. The capacity of the plant has been increased twice since the first of December, but so great is the demand for protective devices that the company is working day and night to keep up with the orders.

THE CARBOLINEUM WOOD PRESERVING COMPANY, Milwaukee, Wis., has published a little pamphlet which gives the abstract of an article: "The Preservation of Wood," published in "The Technical Review of Natural Science," a European paper of high standing. Several methods of wood preservation are reviewed and all are adjudged unsatisfactory. The Carbolineum company claims that its product, Avenarius Carbolineum, is free from the faults of the condemned preservatives.

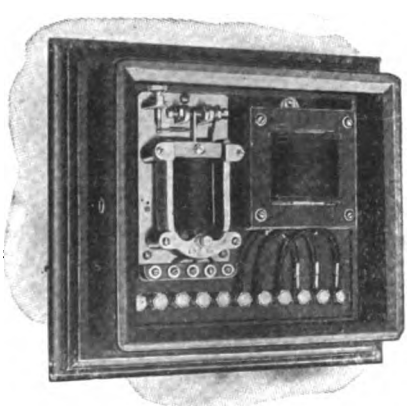

Fig. 5. Eight-party signal case for transforming an ordinary instrument into a selective telephone.

THE FARR TELEPHONE AND CONSTRUCTION COMPANY, 118-120 West Jackson Boulevard, Chicago, Ill., shows great confidence in the quality and reliability of its instruments. To demonstrate their merit it will send a telephone on thirty days' trial to be returned at its own expense should the apparatus prove unsatisfactory. This company has been making telephones and switchboards for eleven years, and is now sending out a catalogue of electrical specialties for 1906, showing an exceptionally complete line of supplies for the equipment of telephone systems. One of the valuable features of this book is that an illustration is provided for nearly every individual piece of apparatus, showing its exact appearance.

THE ELECTRICAL TIMES, issued by the W. G. Nagel Electric Company, Toledo, O., contains in the July issue the usual number of bright and interesting articles. A valuable feature is the list of current prices printed on the final pages. Copies may be obtained free of charge by writing to the company.

THE WESCO SUPPLY COMPANY, St. Louis, Mo., wish to announce that its new General Electrical Catalogue No. 100 is now completed and is being distributed to those actively engaged in the electrical trade, either as contractors, dealers, engineers or operators of central stations.

This is without doubt one of the most complete catalogues of its kind ever published, containing complete descriptions, with valuable data, concerning all modern electrical goods, appliances, devices and specialties, together with information of value to all electrical workers. All buyers of electrical goods are invited to send their names and addresses together with their occupation to the Wesco Supply Company for a copy of this catalogue, which will be sent promptly, express prepaid.

THE DEAN ELECTRIC COMPANY, Elyria, Ohio, reports, among others, contracts which have recently been received for switchboards to be installed at the following places:

Boughtonville, O.; Vandalia, Ill.; Hendrysburg, O.; Plymouth, N. C.; Wakeman, O.; Lexington, Mo.; Elkhorn, Wis.; Thompson, O.; Cowgill, Me.; Rantoul, Ill.; Chatham, N. B., Can.; Schenectady, N. Y.; Pikeville, Ky.; Saybrook, Ill.; Bowling Green, Ky.; Toledo, O.; Mendota, Ill.; Doylestown, O.; Sussex, N. B.; Cuyahoga Falls, O.; Riverside, N. Y.; North Ridgeville, O.; Barneston, Neb.; Treadwell, N. Y.; Penfield, Ill.; Tippecanoe, O.; Ravenna, N. Y.; Massillon, O.; Salem, Ia.; Majestic Springs, O.; North Creek, N. Y.; Birmingham, O.; Greensburg, Pa.; New Weston, O.; Connellsville, Pa.; Penfield, Ill.; York, O.; Pesotum, Ill.; Pettysville, Ind.; Raymond, O.; Sackville, N. B., Can.; Mt. Orab, O.; Claypool, Ind.; River Styx, O.; Elmira, N. Y.; Elyria, O.; Lebago, Me.; Covington, O.; Maddisonville, Ky.; Smock, Pa.; Parma, Mich.; Modoc, Ind.; Cardington, O.; Toledo, O.; Bloomington, Ind.; Morrisville, Vt.; Fremont, O.; Springfield, Tenn.; Pottsville, Pa.; Farmersville, O.; Albany, N. Y.; White Water, Kas.; Convoy, O.; Schenectady, N. Y.; Berlin, Germany; Lima, O.; Indianapolis, Ind.; Amsterdam, N. Y.; Levis, P. Q., Can.; Breesfort, N. Y.; Amherst, N. S.; Douglass, N. Y.; Everett, Wash.; Elyria, O.; Detroit, Mich.; Howard, Pa.; Sardina, O.; Des Moines, Ia.; Tontogany, O.; Revenna, N. Y.

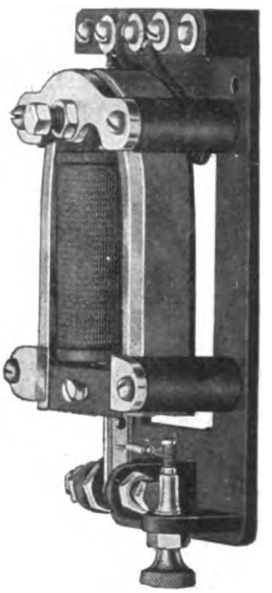

Fig. 4. Zabel selecting relay.

It is also stated that the installation of the Dean telephones for subscribers' stations is being taken up by many companies who wish to use them in connection with switchboards already installed, as well as in new exchanges.

THE CALCULAGRAPH COMPANY, 1437 Jewelers' Building, New York, is distributing a reprint of a very interesting article entitled "The Beginning of a Cost Accounting System," which was contributed to *American Industries* by Henry Abbott, the president of the company. A discussion of the effect of different systems of timing telephone conversations upon the revenue is taken up. Copies of the paper can be secured by managers who wish to add to their information on this subject by mailing a request to the office of the company.

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CORDS : CABLES WIRES

We Manufacture

Cords for Telephones and Switchboards : : :
Cables and Wires for Switchboards : : :
Cables for Interior Purposes : : : : :

SECURE OUR PRICES

Write Us Concerning Our No. 100 Sw. Bd. Cord.

Runzel-Lenz Electric Mfg. Co.

97-101 South Clinton Street, Chicago

Mr. MANAGER,

You Can Reduce Your Operating Expenses!

HOW? By Installing Our Special Labor Saving Accounting and Filing System.

Send TO-DAY for Free Booklet, Catalogs and other Useful Information.

WE ARE QUITE "STUCK UP"

With Our

Gummed Labels of National Emblem

IN TWO COLORS

Just the thing for cheap, effective advertising.

Write for Special Emblem Circular showing 17 sizes of one and two color cuts and our Gummed Labels.

BANGLE PINS! The Latest Novelty Showing National Emblem!

Every Boy and Girl in Your Town Will Wear One.

WRITE FOR SAMPLES AND PRICES.

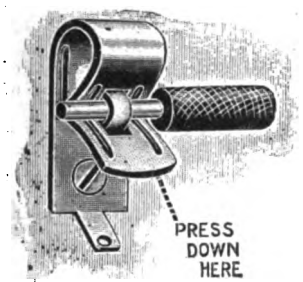
Telephone Systems Department

THE Edwards-Hine Co.

5-7 E. Pearl Street, GRAND RAPIDS, MICH. U. S. A.

Mention American Telephone Journal.

THE STRONG GRIP



of the

Fahnestock Spring Binding Post

is a point that recommends it to the discerning man.

No dirt nor corrosion of the wire has any effect on a contact which is under such great pressure.

The large manufacturers supply dry batteries fitted with these posts free of charge. Specify them.

FAHNESTOCK ELECTRIC CO.

129 Patchen Avenue Brooklyn, N. Y.

ARE YOU PAID

for the full time your toll lines are in use?

THE CALCULAGRAPH

exactly times all messages and prints both the elapsed time and the time connection is made on a card. The operator does not guess or estimate the overtime charge; *she knows!*

IT MAKES NO CLERICAL ERRORS

Write for Booklet

THE CALCULAGRAPH COMPANY

1437 Jewelers Building New York City

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THE WEEK'S MESSAGES

NEW COMPANIES.

HOLYOKE, COLO.—The Holyoke Telephone Company, Holyoke, Colo., has been incorporated with the following incorporators: George W. Shules, August Schenneman and A. T. O'Connor, all of Holyoke.

SODA SPRINGS, IDAHO.—The Soda Springs-Lago Telephone Company has been organized and has built lines to Niter. It is the intention of the company to build lines to Lago also.

FISHER, ILL.—An Independent Telephone Company is being organized at Fisher, and the following officers have been elected: J. K. Waddington, president; Frank Boyd, secretary, and J. O. Sayers, treasurer.

GREENVILLE, ILL.—The organization of a new Independent telephone company, to be known as the Mutual Telephone Company, is under way at Greenville. The company will be capitalized at $10,000, and numbers among its incorporators the following: C. D. Hoiles, S. W. Hubbard, Wm. T. Easley, J. M. Hawley, E. E. Elliott, G. B. Hoiles, J. S. Bradford, Geo. Grube, Ward Reid, A. J. Miller, J. W. Koonce, A. M. Keith, S. T. Henry and Geo. Weise.

DUNLAPS, IND.—The Dunlaps Mutual Telephone Company is the name of the new company organized by farmers in Elkhart county. It is to be managed on the mutual plan, and will start with nearly three hundred subscribers. The officers of the new company are: President Calvin Huber; secretary, William Beasecker; treasurer, Harvey Miller.

HOLLAND, IND.—Articles of incorporation have been filed by the Holland Telephone Company, of Holland. The capital stock is placed at $1,800, and the following directors have been elected: Christine Roettger, William Blesh and John Heitman.

BEATTYVILLE, KY.—The Home Telephone Company, of Beattyville, Ky., has been incorporated with a capital stock of $10,000. Among the incorporators are G. W. Cann, J. C. Richardson and others.

HEATH, MASS.—A new Independent Telephone Company is being organized at Heath with the following officers: I. W. Stetson, president; C. J. Hager, secretary and treasurer; Fred Stone, Levi Cooley and Ernest Payne directors.

QUINCY, MASS.—Articles of incorporation have been filed by the County Home Telephone Company. The capital stock is placed at $2,500, and E. Best, James F. Barrett and Thomas S. Elliott are named as incorporators.

HASTAIN, MO.—A new Independent telephone company is being organized at Hastain which is to be called the Hastain Telephone Company. S. M. Calbert and W. H. Gallagher, of Warsaw, are interested in the formation of the company. The company's line will start at Climax, extending through Hastain, and connecting with the exchange at Warsaw. The following officers have been elected: I. W. Lutman, president; G. P. Howell, vice president; C. M. Davidson, secretary; G. S. Hart, treasurer.

LATHAM, MO.—There is a movement on foot to organize an Independent Telephone Company to connect with the Mutual. The exchange will furnish service to the following points: California, Tipton, Fortuna, Mutual and Cotton. Ten other towns in Moniteau, Miller and Cole counties will also be furnished with service as soon as the lines can be built. It is estimated that the company will spend about $150,000 in the construction of these lines, and that eventually connection will be made with the Kinloch long distance system.

LONE STAR, MO.—The Barnitz Farmers' Mutual Telephone Company, of Lone Star, has been incorporated with a capital stock of $15,000. The incorporators are P. D. Jones and T. E. Crowder, of Elm; W. I. Fine and Elias Jones, of Burmah, and J. A. Addington.

VIRGINIA, NEV.—A company having for its purpose the construction of a telephone line between the Ramsay mining district and Virginia is being formed by the people in the camp. The company proposes to install a first class line and to build a local system in Ramsay. The incorporators of the company are mostly from Southern Nevada, Reno and Virginia.

FRENCHTOWN, N. J.—The Stover Telephone Company, of Frenchtown, N. J., has been incorporated with a capital stock of $10,000. The incorporators are John J. Stover, C. C. Stover, M. C. Stover, Samuel Eddy and Josiah C. Butler.

ANETA, N. D.—An Independent telephone company has been formed at Aneta, and will soon commence the construction of a line from Aneta to Devils Lake, taking in the new towns in the southern part of the county.

ASHLAND, O.—Articles of incorporation have been filed by the Ruggles Telephone Company, of Ashland, O. The company has a capital stock of $2,000, and numbers among its incorporators the following: F. D. Hamilton, H. U. Sutherland and B. J. Ferris.

MOOREFIELD, O.—The Farmers' Mutual Telephone Company, Moorefield, O., with a capital stock of $5,000, has been incorporated by the following incorporators: Clarence Cotton, Scott Danner and John W. Riley.

OLD FORT, OHIO.—The Old Fort Telephone Company has been organized by R. G. Shannon and others.

ROOSEVELT, OKLA.—The Kiowa County Rural Telephone Company has been incorporated with a capital stock of $10,000. The incorporators are B. L. Shoup, J. H. Butler and Charles Alexander.

WELLSTON, OKLA.—Articles of incorporation have been filed by the Wellston-Lutzer Telephone Company, of Wellston. The company has an authorized capital stock of $10,000, and numbers the following among its incorporators: Wm. Raupe, F. Raupe and Frank Weathers.

MILTON GROVE, PA.—The farmers of Mt. Joy township and a number of the leading citizens of Milton Grove have organized the Milton Grove and Mt. Joy Telephone Company, which is to build a line between Mt. Joy and Milton Grove.

MOUNT AETNA, PA.—Howard Frame, of Reading, is interested in the formation of a new telephone company, to build lines from Mt. Aetna to Myerstown and Lebanon.

NEWCASTLE, PA.—An Independent telephone company to operate lines in South New Castle borough, Taylor and Shenango townships has been organized. A charter is to be applied for.

HOUSTON, TEX.—Judge J. M. Reagan, of Houston, and associates are at work organizing an Independent long distance telephone company. The company will be known as the Southern Telephone Company, and its lines will extend from Houston west to connect with the Independent lines in San Antonio. Local exchanges will be installed at Richmond, Rosenberg, Wharton, El Campo, Victoria, Cuero, Yoakum, Eagle Lake, Columbus, Weimar and Schulenburg.

BOWLING GREEN, VA.—The Caroline County Telephone Company has been organized with the following officers: C. T. Smith, Croxton, president; W. E. Innes, vice-president; N. T. McMananay, secretary; L. E. Martin, treasurer.

PARSONS, W. VA.—The Alliance Telephone Company, of Parsons, W. Va., has been incorporated with a capital stock of $5,000, to construct telephone lines between Parsons and neighboring points. The officers of the company are: G. T. Wilson, president; L. C. Baker, vice-president; George A. Dean, secretary; J. Riley Phillips, treasurer.

RACINE, WIS.—The Union Grove Telephone Company has been incorporated with a capital stock of $5,000. The company is to construct lines through the adjacent towns.

ST. CROIX FALLS, WIS.—Articles of incorporation have been filed by the St. Croix Valley Telephone Exchange. The capital stock of the company is placed at $25,000, and the incorporators are Thomas H. Thompson, Fred Olcott and William C. Thompson.

SARATOGA, WYO.—The ranchmen of Saratoga and vicinity have formed an Independent telephone company to construct lines between Saratoga and Brush Creek.

FRANCHISES.

PONTIAC, ILL.—A. J. Vernier, manager of the Independent Telephone Company, of Kankakee, has been granted a forty year franchise at Pontiac.

EVANSVILLE, IND.—The Citizens' Telephone Company is again applying for a franchise at Evansville.

LEAVENWORTH, KAS.—The Independent Telephone Company, of Atchison, has been granted a franchise at Leavenworth, and construction of the company's system will be commenced at once.

LIBERTY, KAS.—The Home Telephone Company is applying for a franchise to establish a local system in the city of Liberty. It is the intention of the company to build lines connecting with the farmers in the surrounding towns.

ADRIAN, MO.—The Farmers' Telephone Company, of Burdett, is to apply for a franchise to build lines into the city of Adrian.

MILWAUKEE, WIS.—The Wisconsin Metropolitan Telephone Company has applied for permission to build a second telephone system in Milwaukee.

FINANCIAL.

WARREN, N. H.—The Baker's River Telephone Company has increased its capital stock to $8,000.

DAYTON, O.—The Home Telephone Company is to pay its regular quarterly dividend on its preferred stock on August 1.

BELOIT, WIS.—The Beloit Farm Telephone Company has increased its capital stock from $5,000 to $10,000.

JANESVILLE, WIS.—The Rock County Telephone Company has declared its usual 5 per cent. dividend on business for the last six months.

COMBINATIONS.

LOS ANGELES, CAL.—A company has been formed at Los Angeles to take all of the Home telephone plants in Southern California. Articles of incorporation, calling for a capital stock of $10,000,000 have been filed.

SHANNON CITY, IOWA.—Arrangements have been completed by Mr. J. N. Smith, of the Southern Iowa Telephone Company, for the taking over of the stock of the Shannon City Telephone Company.

HOWARD, KAS.—The telephone systems owned by Dr. J. H. Close at Severy and Howard and the toll line between the two towns have been

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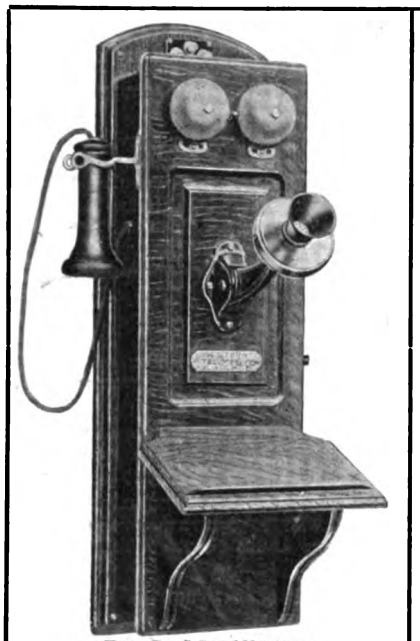
Some of the Products of our Factory

Write for Green Booklet that illustrates and describes our Newest Types of Telephones



Type C. 5 Bar 1300 Ohms

5 Bar 1600 Ohm Magneto

Type D. Desk Stand

WESTERN TELEPHONE MANUFACTURING COMPANY

58 W. JACKSON BOULEVARD Established 1893 CHICAGO

THE TRUNK BUTTON

on the Couch Intercommunicating Telephone enables this system to do the work of a branch exchange without the services of an operator. This arrangement requires only two extra wires.

The Automatic Reset switch leaves the station in condition to be called after using.

Trunk Button

Send for Catalogues

STANDARD SIZES:

8	intercommunicating	buttons,	1	exchange	button
14	"	"	1	"	"
18	"	"	1	"	"
24	"	"	1	"	"
28	"	"	1	"	"

100% CHEAPER THAN BRANCH EXCHANGE.
100% QUICKER; 100% MORE SATISFACTORY.

S. H. COUCH CO., Inc., Manufacturers

162 PEARL STREET, BOSTON, MASS.

Remember

that the poles you are now putting in will all need to be replaced in a few years. In some climates they will last longer than others, but when they do rot out they will all go at once, and the combined expense is going to be heavy. Why not put off this date? ¶ Why not use Avenarius Carbolineum and by more than doubling the life of your poles cut out this bill entirely?

Absolutely prevents rot Easily applied

Write for information

Carbolineum Wood Preserving Co.

Sole United States Agents
Milwaukee, Wis.

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sold to the O. B. Walker Telephone Company of Howard. The systems will be improved and extended.

GRAND MEADOWS, MINN.—The Home Telephone Company has made arrangements to connect with the lines of the Tri-State Telephone Company.

OSAKIS, MINN.—Mr. F. B. Canada has purchased Mr. C. H. Bronson's interests in the Osakis Telephone Company, and is now sole owner of the plant.

AMORET, MO.—The Farmers' Telephone Company, of Charlotte township, has purchased the Reinheimer line from Miami Creek to Amoret. It will at once commence the construction of a line to Virginia.

TECUMSEH, NEB.—The Johnson County Home Telephone Company, with headquarters at Tecumseh, has taken over the exchange and rural lines of the Adams Telephone Company, and will give a combination service with the town of Adams.

JEFFERSONVILLE, N. Y.—William H. Lawrence, of Jeffersonville, has sold his entire system of telephone lines to a syndicate composed of G. V. Scheidell, of Jeffersonville; G. Mayers, of Youngsville; Louis Bavernfeind, of North Branch; Martin Herman, F. S. Anderson and Harry B. Rogers. The line will be improved and extended by connection with other lines, and eventually a long distance line will be built. It is also the intention of the owners to build a line to Liberty. The present territory covered by the system includes Jeffersonville, Kernoza Lake, North Branch, Obernburg, Hortonville, Callicoon Center and Youngsville.

ELECTIONS.

MENA, ARK.—The Mena Smithville Telephone Company has elected the following officers and directors: President, I. D. Jones; vice-president, J. I. Alley; secretary and treasurer, C. A. Smith. Directors: G. L. Lochridge, W. E. Anderson, J. I. Alley, Bert Hiltebrand, C. A. Smith, I. D. Jones and S. B. Graham.

GLENS FALLS, N. Y.—The New Union Telephone Company has elected the following directors: John T. Christie, James H. Caldwell, William Connors, William C. Geer, William C. Colburn, Peter McCarthy, W. L. Burk and Arthur MacArthur, of Troy, and Charles W. Cool, of Glens Falls.

JAMESTOWN, N. Y.—The following directors have been elected by the Home Telephone Company: Arthur C. Wade, William J. Maddox, Brewer D. Phillips, S. B. Burchard and Ralph C. Sheldon, of Troy; Thomas W. Finucane, Carl F. Lomb, Frederick W. Zoller, George R. Fuller, John C. Woodbury and W. R. McCanne, of Rochester.

SENECA, N. Y.—The Seneca-Gorham Independent Telephone Company has elected the following officers: J. A. Driscoll, president; D. S. Allen, vice-president; Rice Macauley, secretary and general manager; William Pulver, treasurer.

SYRACUSE, N. Y.—The Independent Telephone Company, of Syracuse, has elected the following officers and directors: President, Henrick S. Holden; vice president, George R. Fuller; secretary, Alexander H. Cowie; treasurer, Albert K. Hiscock; general manager, J. F. Stockwell; directors, Henrick S. Holden, George R. Fuller, Alexander H. Cowie, Albert K. Hiscock, Jacob Amos, Gates Thalheimer, John J. Cummins, Thomas W. Finucane, Fred W. Zoller, Carl F. Lomb and Charles M. Warner.

PERSONAL .

J. W. CHRISTIE, for several years general superintendent of the Northwestern Telephone Exchange Company, has been made treasurer of the company with headquarters at Minneapolis, Minn.

ALBERT FOSTER, formerly general superintendent of construction for the Citizens' Telephone Company of Terre Haute, has been appointed general superintendent of the Wabash Valley Telephone Company at Paris, Ind.

I. H. GAITHER, formerly chief engineer and general manager of the Atlantic Coast Construction Company, with headquarters at Suffolk, Va., has resigned to become general manager of the Northern Telephone Company, of Greeley, Col.

LEE HUFF has been appointed manager of the Lincoln office of the Nebraska Telephone Company.

GEORGE H. PIERCE has been appointed manager of the Home Telephone Company of Vincennes, Ind.

MISCELLANEOUS.

PORT ARTHUR, ONT., CANADA.—The village of Hymers has petitioned the Port Arthur Telephone Company to install a system there and build a long distance line to connect the two places. Details will be furnished by J. McTeigue, town clerk, Port Arthur, Ont., Canada.

New Construction in the Field

EL CAJON, CAL.—The Home Telephone Company is extending its service in order to take care of its increased business.

GLENWOOD SPRINGS, COLO.—The system of the Glenwood Telephone Company is being greatly extended and improved.

ATWATER, ILL.—A new telephone line from Atwater to Macoupin is to be constructed by Lawrence Switzer.

BELVIDERE, ILL.—The lines of the Belvidere Telephone Company are to be reconstructed, and some extensions will also be made to its system.

HEYWORTH, ILL.—The Heyworth Telephone Company is extending its lines to Lytleville.

TAZEWELL, ILL.—A new switchboard is to be installed by the Tazewell County Telephone Company.

VAN BUREN, IND.—It is the intention of the Van Buren Telephone Company to rebuild its system, and to make some extensions.

BANCROFT, IA.—A number of new lines are to be built by the Bancroft Mutual Telephone Company.

CHEROKEE, IOWA.—The New State Telephone Company is placing 16,000 feet of cable underground in the business section of Cherokee.

FORT DODGE, IOWA.—The Fort Dodge Telephone Company is placing many of its wires underground in Fort Dodge.

LEON, IOWA.—The Decatur County Mutual Telephone Company, which has just established its exchange and completed the construction of three new lines, is building a line from Woodland to Leon. Other lines are to be added and connections with the exchanges at Decatur, Grand River and Van Wert will be arranged for.

NEW MARKET, IOWA.—The Farmers' Mutual Telephone Company, which is constantly building new lines, has recently installed a new switchboard to take care of the increasing business.

TREYNOR, IOWA.—The Independent Telephone Company of Treynor is building a line to Des Moines.

BUCHANAN, MICH.—The construction of a number of rural lines is to be undertaken by the Buchanan Telephone Company. When the work is completed there will be about 350 telephones on the Buchanan exchange.

ST. JOSEPH, MICH.—The Twin City Telephone Company, which has just completed a line to Bainbridge, is to still further extend its system.

SPRINGPORT, MICH.—The installation of a new switchboard is among the promised improvements of the Springport Telephone Company.

CLEARWATER, MINN.—The Independent Telephone Company, of Clearwater, contemplates making connections with the St. Augusta line, thus enabling it to give service to St. Cloud.

NELSON, MINN.—The construction of the Nelson and Neyens Mutual Telephone Company's lines has been commenced.

PINE ISLAND, MINN.—The Pine Island Telephone Exchange is considering the advisability of building the Oronoco exchange across the river to connect with the Hammond line.

MEREDITH, N. Y.—The lines of the Meredith Telephone Company are to be extended to Long Island, Lake Winnipiscogee and other points.

ATTICA, N. Y.—A new switchboard is being installed in the central office of the Attica Home Telephone Company. The company, which now has lines running to Alexander, Bennington and Cowlesville, contemplates establishing connections with Varysburg, Johnsonburg, Attica Center and the surrounding territory.

SYRACUSE, N. Y.—The Independent Telephone Company expects to push all of its construction work as much as possible. A trunk line is being built to Binghamton, where connections will be made which will give the company direct service to Philadelphia and into the coal regions of Pennsylvania. Lines are also being built to Pulaski and Watertown, and additional circuits will be added to the Utica line to take care of the increased business.

GOODRICH, N. D.—The local telephone company will install a new switchboard and otherwise improve its system.

LAKOTA, N. D.—The Tri-County Telephone Company's lines will be extended from Lakota to Adler.

OMEMEE, N. D.—The Northern Telephone Company, which is building a line between Omemee and Overly, will also build a line from Brisbee to Lansford.

CARDINGTON, O.—The Morrow County Telephone Company is installing a new exchange at Cardington.

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VOLUME XIV *SATURDAY, AUGUST 18, 1906* *NUMBER 7*

Some Features of Interior Block Distribution on Manhattan Island

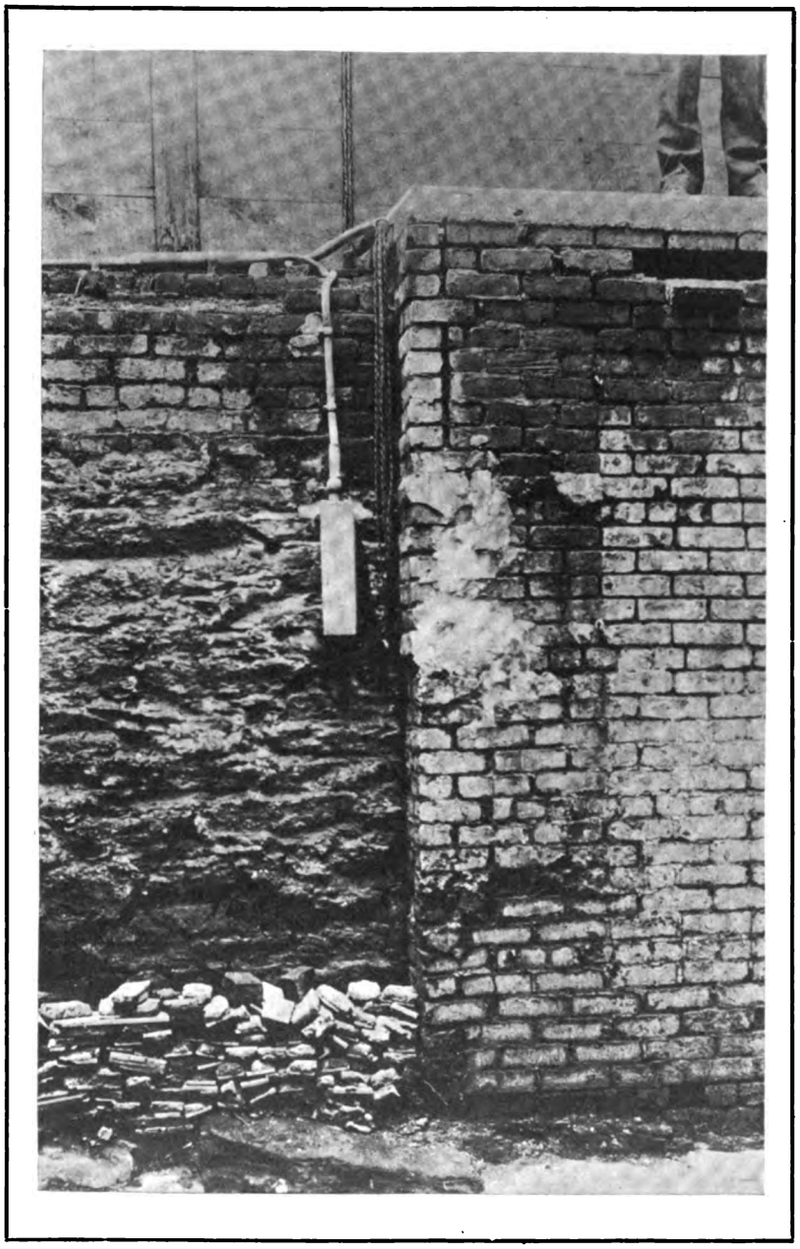
By O. R. Barnes.

ON Manhattan island there are in use three distinct methods of distribution. The first of these methods consists of the widely known roof top fixture which has always been a source of many evils wherever used. The second is the junction box method which is now the predominating method used in most large cities of the East. In the third we recognize the only ideal method — direct connections. Doubtless this method will eventually replace all others on Manhattan. These three methods go to make up the entire system.

To appreciate the advantages and disadvantages of these three methods it is essential that the reader should clearly understand the formation of a typical Manhattan block so as to permit him to recognize that while they are applicable on Manhattan they are not the methods which it is advisable to adopt in other large cities where the properties are scattered, without very radical and expensive modifications.

It is due to the uniformity of the blocks in the city of New York that the engineers have been enabled to dispense with the overhead or roof-top method. It can safely be said that few other communities in the country offer so fine facilities for good distribution.

Blocks in most cities are, as a rule, intersected or sub-divided by narrow streets and alleys which spread them out considerably. This is not the case on Manhattan, for every block here is built up solidly until the rear yards are entirely shut off from the streets. Fortunately for the engineers the rear yards are always provided with good substantial walls or fences dividing them in straight lines and at right angles. It is on these fences that cables and boxes are placed. There are about 3,000 of these blocks, all practically identical in formation.



Junction Box Mounted on Dividing Wall in New York Block. Note Cable Dropped to Make Box Easy of Access and Paired Wire Leads to Stations.

The roof fixture was the method of interior block distribution used prior to 1896 and is now almost obsolete, it being replaced by the junction box and direct connection methods. Only one per cent. of the entire system remains in this form of distribution today.

Usually the corner property of each block was selected for roof-top fixtures, but not infrequently all four corners. If the proper right of way could be obtained the cable was run from an underground connection through the basement and upon the building walls to the roof, thence it was laid in a wooden channel on the roof to the fixture. Often no rights-of-ways were secured and it then remained for the men themselves to pick out a location and erect the fixture without being caught — a dangerous piece of business, to say

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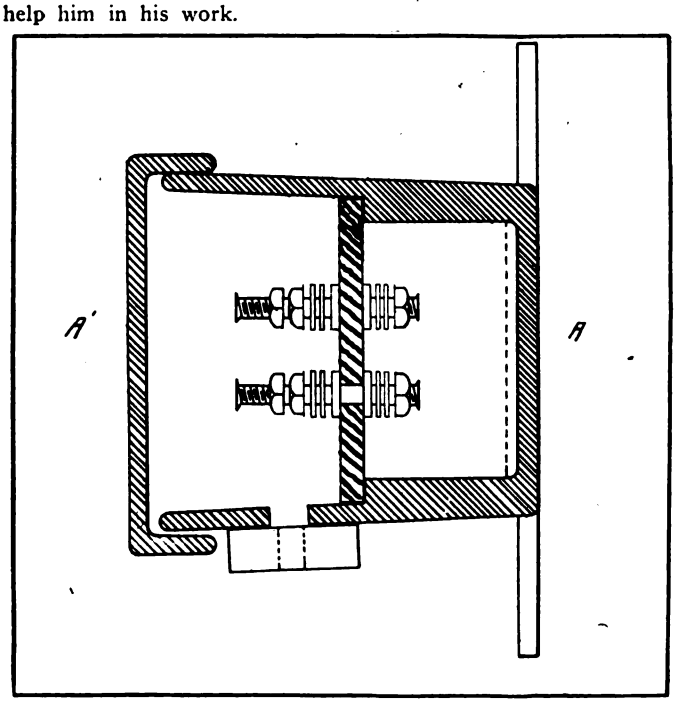
the least. When a fixture was erected under these tactics it was fed by an aerial cable from a fixture in an adjacent block, and until a sleet storm brought the wires down the owner of the property was none the wiser. Some of these old time fixtures served more than 200 telephones. The wires radiating to attachments on chimneys, cornices and walls presented a convenient support for everything from an old leather boot to a worn out shirt. Many a thrifty housekeeper utilized them as clothes lines.

To this method of distribution we owe our first important lesson in cable engineering—flexibility.

In the olden days, before competition was dreamed of, and when rights-of-way were obtained by merely a line of treats, this method was thought by some engineers to be the ideal scheme for distribution. As public sentiment and civic pride began to exert themselves, due to the reckless use of roofs, and the unsightly attachments to chimneys, etc., the company was obliged to devise other methods to reach its subscribers or else pay enormous sums in roof rentals and in settling claims for damage that was continually being done to chimneys and walls by its wires. To this method is attributed the crippled condition of more than 1,500 chimneys on Manhattan. In one sleet storm alone in 1902, when only five per cent. of the system was distributed from roof fixtures, more than 500 chimneys were pulled down.

Thus it was that serious difficulties presented themselves in connection with the roof fixture method. Property owners saw that wholesale damage was being done their premises and they immediately formed a company under the name of the Trespass Inspection Company to compel the telephone company to pay them $100 yearly rental for each and every roof fixture in service, together with an agreement to keep the roof in repair.

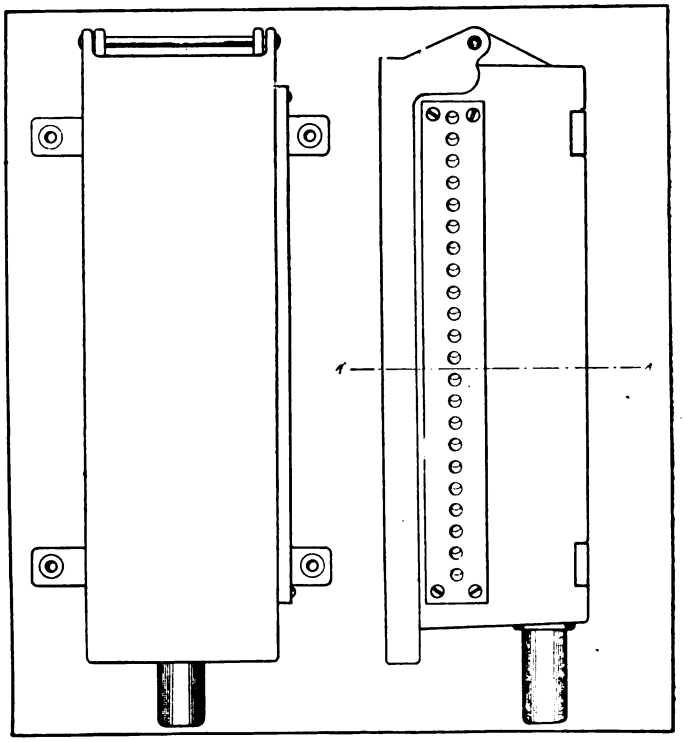
With the public aroused against this method of distribution its continuance became extremely difficult. A single property owner often had an entire block at his mercy and with one stroke of an axe could put anywhere from 50 to 200 telephones out of service. Before performing this operation, however, the property owner made it a point to acquaint his neighboring property owners with his intentions and get them to agree to help him in his work.



Sectional View of Junction Box Used on Manhattan Island; Section Taken on Line A'A of Elevation in Upper Figure.

In sketching some of the history of the roof fixture sufficient has been said to show conclusively that the company found the depreciation and maintenance costs too high, and was driven to adopt a method more flexible and less expensive from a right-of-way point of view. A further very apparent objection to the roof fixture method was that the blocks were becoming congested with wires. The method served very well when the company had only a paltry 10,000 subscribers, but as they reached the 200,000 mark something radical had to be done. With competition threatening them as an incentive they set about to experiment with the junction box method.

From the beginning the junction box method has been a success. The rights-of-way have been easily obtained upon the mere assurance that it is to replace the overhead wires. In fact, the rights-of-way are a secondary consideration. When this method was first adopted it is said that the astute managers took pains to secure the good will of the leading real estate agents. These real estate agents usually signed a couple of hundred blank permission forms at a time which they turned over to the company to fill in and use as required. The company found the real estate agent a more lenient man than the formidable owner and as long as he was loyal and in accord with their scheme why should they worry about the owner's permission? And so it happened that the telephone company always had a bundle of signed right-of-way permissions ahead.



Front and Side Views of Iron Junction Box of the Type Used on Manhattan Island. Note That no Lock is Provided for the Hinged Cover.

The work of changing from roof fixtures to junction boxes has been easy and has progressed rapidly.

The reconstruction work has now been going on for about eight years; during this time between 300 and 325 miles of cable in sizes ranging from 11 pairs upward have been run on fences and walls in all but a few of the 3,000 blocks. In addition to the block cable the company has a little over 1,000 miles of feeder cables in sizes from 51 pairs to 606 pairs. Including the block feeder and a small portion of aerial cable there are close to 350,000 miles of wire on Manhattan, most of which is No. 19 and No. 22 gauge. The block cable is nearly all No. 22 wire.

Undoubtedly the junction box now used is an extremely satisfactory and economical device, well suited to existing local conditions. It is simple in construction and cheap; neat and compact in appearance; durable and thoroughly weatherproof, it is a most excellent distributing box for outside work and is pre-eminently serviceable in maintaining a flexible cable system.

This box is made of cast iron. The smallest size, measuring 12 inches high, 4 inches wide and 4½ inches deep, is provided with facilities for 11 pairs of wires. The cover is cast separately and fastened to the top of the box by means of rivets to form a hinge. Openings are made at both ends of the box which are

(*Continued on page* 104.)

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Standard Forms of Accounting*

THE following plan for the classification of the various items arising in the keeping of a telephone company's accounts is recommended by the Committee on Standard Forms of Accounting in its report to the members of the International Independent Telephone Association:

SECOND: CLASSIFICATION OF INCOME (RECEIPTS.)

1. Telephone rentals.
2. Long distance toll earnings.
3. Local toll earnings.
4. Pay station receipts.
5. Pole line earnings.
6. Conduit earnings.
7. Measured service excess calls.
8. Telegraph line earnings.
9. Private toll line earnings.
10. Sale of old material.
11. Miscellaneous income.
12. Interest on bank balance.
13. Messenger fees.
14. Dividends and interest on stocks owned.
15. Any other earnings not covered by above.

THIRD: CLASSIFICATION OF CONSTRUCTION (INSTALLATION AND EQUIPMENT ACCOUNTS).

(*A*) *Pole lines*:

This account to include the cost of poles, cross arms, insulators, hardware and all sundry material; including also the cost of setting and painting poles, freight, cartage, wages and cost of handling.

(*B*) *Wires and cables (aerial)*:

This account to include the cost of all circuit wire, tie wire, drops, cable, cable hangers, sleeves, cable terminals, and all labor employed including freight and cartage, up to and including the house-bracket.

(*C*) *Interior wiring and equipment*:

To this account will be charged the cost of complete telephone instruments, house cable covered wire, office wire, inside fittings, junction boxes, lightning arresters and all labor employed in installing same.

(*D*) *Subways*:

This account to include the cost of man-hole frames and covers, I beams, conduits, cement, paving, lateral bends, lumber and all freight, cartage, labor and sundry materials used in the construction of subways.

(*E*) *Cable underground*:

This account to include the cost of cable and labor putting same in conduit, freight, hauling, tools, splicing, testing and connecting, including terminals, etc.

(*F*) *Exchange equipment*:

This account to include the cost of new switchboards, cable, cross connecting boards, storage batteries, charging machines, ringing machines, freight, drayage, and the labor of installing same. This account to be used when plant is enlarged or improved and in no case should be confused with repairs to exchange equipment under maintenance.

(*G*) *Booths and pay stations*:

This account to include the cost of all booths, coin boxes, signs and fixtures installed at central offices and pay stations, freight, drayage and labor employed.

(*H*) *Private branch exchange*:

This account to include the cost of private exchange switchboard and the cost of installing complete and the complete cost of intercommunicating systems including labor, and all materials used, all interior wiring, and telephones installed in connection with private branch exchange switchboard to be charged to sub-division *C* under construction.

(*I*) *Soliciting*:

To this account should be charged the salaries and expenses of solicitors engaged entirely on new work or extension of plant. If part of his time is engaged in maintaining old business that part should be charged to soliciting, operating.

(*J*) *Right of way*:

This account to include the cost of all rights and permits, exclusive of franchises, to construct, operate and maintain pole lines or other equipment along or over private or municipal property.

(*K*) *Franchise*:

This account to include the cost of city or town franchises, granting the right to construct and operate telephone lines and systems and extensions of original property including all expenses incidental thereto.

(*L*) *Toll lines*:

This account to include the cost of all circuit and pole lines, including labor, freight, hauling and sundry materials, erected strictly for toll purposes.

(*M*) *Real estate and buildings*:

This account to include the cost of all real estate and buildings acquired in any manner.

(*N*) *Tool account*:

To include the first cost of all new tools purchased.

(*O*) *Construction salaries*:

Charge to this account all salaries applicable to construction work which cannot be distributed in the foregoing subdivisions. This refers particularly to a proportion of salaries of the general officers of the company.

(*P*) *Interest and discount during constructions*:

This account to include the interest paid on all loans effected for construction purposes, also the discounts on stocks, bonds or other securities used by the company and sold at a discount, for construction purposes. Any interest earned by the temporary lending of construction funds to be credited to this account.

(*Q*) *Legal expenses*:

Includes all law expenses in connection with organization, franchises, etc. These expenses must not be distributed through the various other accounts—such law expenses as may be incurred in connection with the purchase of rights of way and real estate may be charged to the account "Right of Way" of "Real Estate and Buildings," provided the expense is incurred only in connection with the purchase of some particular right of way, or piece of real estate.

(*R*) *Construction expenses*:

Charge to this account all miscellaneous items of expense not directly covered by any other subdivision.

Note.—Further subdivisions of cost of construction may be made if deemed necessary.

FOURTH: GENERAL ACCOUNTS. DEBITS.

1. Plant.
2. Accounts receivable, rentals, etc.
3. Unexpired insurance.
4. Unexpired directory.
5. Interest on bonds.
6. Treasury stock.
7. Treasury bonds.
8. General office expense.
9. Freight and cartage.
10. Bank accounts.
11. Stable expenses.
12. Warehouse supplies.
13. Furniture and fixtures.
14. Petty cash.
15. Rebates, cancellations, etc.
16. Officers' and clerks' salaries.

*Continued from the issue of August 11th.

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17. Collection expense.
18. Soliciting expense.
19. Taxes.
20. Insurance.
21. Light.
22. Heat.
23. Power.
24. Water.
25. Damage and accident.
26. Stationery and printing.
27. Postage.
28. Advertising.
29. Directory.
30. Traveling expense.
31. Pole and right of way rental.
32. Interest and discount.
33. Rental of real estate and buildings.
34. Pay station commissions.
35. Telegraph line earning commissions.
36. Long distance toll earning commissions.
37. Private toll line earning commissions.

GENERAL ACCOUNTS—CREDIT.

38. Capital stock.
39. Bonded indebtedness.
40. Unearned rentals.
41. Surplus.
42. Bills payable.
43. Accounts payable, vouchers, etc.
44. Accrued interest on bonds.
45. Accrued taxes, state, city and county.
46. Accrued tax on gross receipts.
47. Unclaimed wages.

FIFTH: OPERATING ACCOUNTS.

1. *Salaries and wages, local exchanges*:
Operators, supervisors, monitors, attendants, etc.
2. *Salaries and wages, long distance*:
Toll operators, supervisors, monitors, attendants, etc.
3. *Printing and stationery*:
This account to include cost of all printing and stationery used in the operating departments for compiling records, monthly and daily reports.
4. *Postage*:
Cost of all postage used.
5. *Light: Exchange light*:
This account to include a fair pro rata of total light bills which is considered applicable to operating according to existing conditions. Balance of light bills to be charged to the general expense account of light.
6. *Exchange heat.*
Charge a fair pro rata of total heat bills which is considered applicable to operating according to existing conditions. Balance to be charged to the general expense account, "heat.'
7. *Exchange water*:
Charge a fair pro rata of total water bills to this account as in the case of light and heat.
8. *Exchange power*:
Charge entire power bill to this account.
9. *Exchange rent*:
Charge a proportionate amount of rent applicable to operating department.
10. *Exchange miscellaneous expense*:
This account to include the cost of expense of dining room supplies, hospital, hospital supplies, medical services, travelling expenses, car fares and other items incident to the operating department. In the event of meals being sold to operators or other employes, the proceeds to be credited to this account.

SIXTH: MAINTENANCE ACCOUNTS.

(A) Repairs to pole lines.
(B) Repairs to wires and cables, aerial.
(C) Interior wiring and equipment.
(D) Repairs to subways.
(E) Repairs to cable, underground.
(F) Repairs to exchange equipment.
(G) Repairs to booths and pay stations.
(H) Repairs to private branch exchange.
(I) Repairs to toll lines.
(J) Repairs to real estate and buildings.

All of the above accounts to include the cost of repairs to and replacement of materials, as listed under construction, including freights and cartage and all cost of labor employed.

(*K*) *Soliciting*:
To this account should be charged the salaries and expense of solicitors engaged in maintaining old business.

(*L*) *Repairs to tools*:
To this account should be charged the cost of all repairs to tools, or cost of tools purchased to take the place of tools destroyed or lost.

(*M*) *Miscellaneous expense*:
To provide for all repairs not otherwise specified.

In conclusion we wish to state that it cannot be expected by the members of this Association that a standard system of accounting can be formulated with the expectation that all companies will at once change their present method without a thorough investigation of the advantages of a new system. The general adoption of any uniform system of records will of necessity be effected only in time. We recommend that a permanent Committee of at least five members be appointed to receive and consider suggestions from any or all of the Independent telephone companies, so that said Committee can make such changes or enlarge the system as may be deemed necessary from time to time, and also to act as an advisory board.

Increasing the Range of Transmission*

By J. L. Goodwin.

At the close of the preceding portion of this article the point was brought out that it is possible for the gains consequent upon a proper tuning for certain chosen voice frequencies to be more than offset by the losses introduced in the process of double transformation, if two transforming coils are inserted between the source of current and the line.

These facts and the very complex nature of the frequencies and phase relations of a voice-current have apparently led to the belief by telephonic authorities that the principles of resonance cannot be successfully applied to telephonic circuits except for the purpose of counteracting the capacity of the main line, and thereby reducing the attenuation factor of transmission. Capacity, however, may be successfully placed in series with the primary of a transmitter induction-coil and the circuit tuned for any desired frequency or frequencies, by a method which will be better understood by reference to Fig. 5. It will be seen that in this figure there is represented a variable resistance 1 in series with a constant-potential source of energy 2 in the main branch of a circuit which divides at 3 and 4 into two branches. One of these branches contains the variable resistance 1, while the other branch contains the primary of an induction-coil or transformer 5 in series with a capacity 6 of such value as to neutralize the inductance of the circuit, and make this branch of the circuit resonant for a given frequency. It will be noted that while the circuit divides at 3 and 4 into two branches the source of energy supplying a unidirectional current can only cause a current to flow

*Continued from the issue of August 11.

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through the branch containing the variable resistance 1, the current through the other branch being stopped by the condenser 6. This is the normal condition of the circuit. Consider now the result of varying the resistance 1. Under normal conditions a large proportion of the total resistance of the circuit formed by 1, 2, 3, and 4 lies in the variable resistance 1 itself, with a small drop in potential across the inductive resistance L.

While no current flows normally through the branch of the circuit containing the primary coil 5 and condenser 6, the condenser is charged to the same potential that exists between 3 and 4. It follows that if the resistance 1 be suddenly lowered, as is the case with a telephonic transmitter when a sound-wave strikes the diaphragm thereof, the potential between the points 3 and 4 is proportionally raised, and being now of a higher potential than the condenser 6 the condenser takes a charge, causing a current to flow, as shown by the arrows through coil 5 into condenser 6. This current not only flows under a potential equal to the maximum variation of the resistance of the system, but flows through a circuit whose impedance has been neutralized or reduced by resonance to practically its ohmic equivalent and under a potential equal to the impedance drop across inductance L due to the voice currents, thus raising the charge upon the condenser proportionately.

The effect of this is to enormously increase the available current in the primary coil 5, which in turn proportionately increases the voltage or potential of the secondary circuit. When the transmitter returns to its normal position, the potential of the condenser 6 is again reduced to equal the potential between 3 and 4, and as the diaphragm passes through its normal position and to maximum in the opposite direction, thereby raising the resistance of the circuit, there is again a proportionally-increased difference of potential across 3 and 4 and also across the condenser-terminals, causing it to take a maximum charge and to discharge again upon a decrease in the potential across 3 and 4, due to another reduction in the resistance 1, and thus with each excursion of the diaphragm to and fro the resistance of the transmitter 1 is alternately increased and decreased, raising or lowering the difference of potential across the terminals of the condenser, which in being alternately charged and discharged produces a current through the primary coil 5. It will be noted that by this method an absolutely alternating current is utilized in the primary coil, which varies from a positive maximum through zero to a negative maximum, thus insuring better transformer efficiency and better definition of wave form as a result of permitting the use of a greater amount of iron in the core of the primary coil, which varies from a positive maximum through zero to a negative maximum and then through zero to positive maximum again, instead of merely reducing the value of a magnetic flux of constant polarity from a maximum to a certain percentage of itself. This production of alternating currents in the primary circuit is a distinct and very important step in the art.

From the circuits traced in Fig. 7 it is evident that points 3 and 4 may be divided into a plurality of circuits, each containing the primary of an induction-coil with the necessary inductance and capacity requisite to make each branch resonant for the desired frequency.

By winding the primaries of the induction-coils with an increased number of turns the transformer efficiency may not only be increased, but the inductance of the primary coil itself may largely serve to tune the circuit. It is probably advisable, however, to insert separate inductances in the circuits, so as to use the largest amount of inductance in the primary circuit that is practicable without unduly increasing its resistance, for the reason that by so doing smaller capacities will be required for the necessary tuning. This is desirable because reliable condensers are not only cumbersome and bulky, but also very expensive.

As has been stated in the foregoing, a circuit is tuned or made resonant for a given frequency when

$$2\pi n L - \frac{1}{2\pi n C} = 0,$$

from which by an easy transposition it is possible to solve for either of the three essential quantities n, L, or C necessary for resonance when the other two are given. For example,

$$2\pi n L - \frac{1}{2\pi n C} = 0;$$

then by transposition

$$L = \frac{\frac{1}{2\pi n C}}{2\pi n} = \frac{1}{4\pi^2 n^2 C} = L.$$

As inductance is a factor which has to be determined ordinarily by computation, the expression therefor is here given, which is

$$L = \frac{4\pi t^2 A \mu}{l 10^9},$$

where

t=number of turns in the coil.

A=area of magnetic core in square c. m. cross-section.

l=mean length of magnetic circuit.

μ=permeability of iron core.

In this connection it should be stated that satisfactory results are to be obtained in tuning for resonance only by the use of mica or air condensers. The inventor of this system states that he has found by disappointing and painstaking experiments that paraffin condensers are not to be relied upon, owing to dielectric hysteresis and low insulation, which varies within wide limits with changes of temperature.

The principles and methods of computation above stated make it possible to determine the elements which must be introduced in the primary circuit for the production of resonance for any desired frequency. The next step is to find a means of increasing the effective main line potential, in order to give a maximum current on this line.

As is well known, in order to effect the long-distance trans-

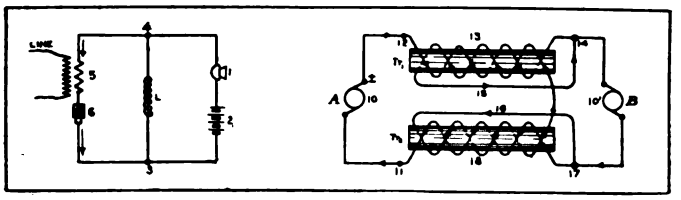

Fig. 6. Diagram at the left illustrates the method of inserting capacity in series with the primary coil and transmitter for the purpose of tuning. The right hand diagram illustrates the principle and method of using compensating transformers in the main line for the purpose of reducing secondary effective impedance and increasing the effective line potential.

mission of a telephonic transmitter-current it is necessary to step up the low-potential current of the primary; but there is a limit in thus obtaining the necessary main-line potential, beyond which improvement is impracticable, and it is here that much is lost to telephony. To throw light upon this point, let the secondary electromotive force in a transformer be briefly considered. As stated in the foregoing, this electromotive force is equal to the primary electromotive force multiplied by the ratio of transformation. This, however, is not all, for the electromotive force so obtained is merely an apparent electromotive force. The ratio of transformation γ may be expressed as

$$\gamma = \frac{2\pi n M}{\sqrt{4\pi^2 n^2 L^2_1 + R^2_1}};$$

but in telephonic transformers R_1, is usually negligible as compared with $2\pi n L$ and the magnetic leakage very low. It, therefore, follows that the coefficient of self-induction, being proportional to the square of the number of turns, the expression

$\gamma = \frac{t_2}{t_1}$, is approximately true. This leads to the consideration of the fictitious nature of the secondary electromotive force so obtained as affecting secondary current. By derivation the secondary current in general may be determined by the equation

$$I_2 = \frac{\frac{t_2}{t_1} E_1}{R_2 + \left(\frac{t_2}{t_1}\right)^2 R_1}.$$

The denominator in this equation shows the limitations of transformation for effective secondary potential. Furthermore, it not only shows that the apparent secondary potential must be di-

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vided by the secondary impedance, but that the primary resistance is a factor transferred to the secondary, and that the transformation ratio is also a factor in the divisor which increases as the square, while the secondary resistance increases directly. To illustrate, consider a transformer with t_1=400, t_2=2,400, R_2 =60 ohms. From the equation would be obtained the value of a certain secondary current. Suppose the secondary turns t_2 be doubled, or made four thousand eight hundred, what would be the result? It is admitted that there should be obtained an apparent secondary potential of twice the original value; but since the secondary resistance has been increased to one hundred and twenty ohms and the square of the transformation ratio $\left(\frac{t_2}{t_1}\right)^2$ from $\left(\frac{t_2}{t_1}\right)^2 = 36$ to $\left(\frac{t^2}{t_1}\right)^2 = 144$ it is readily seen by substitution that in so far as secondary current is concerned the operation has in reality produced an actual loss. This is one reason why telephonic transformers have not been operated on a transformation ratio beyond a certain moderate value. Another reason is that a high transformation ratio has heretofore meant high secondary impedance, which resulted in a greater drop of potential across the secondary terminals than across the receiver-terminals, considering the receiving station or terminal of the circuit. This not only reduces the effective current through the receiver, thus impairing the transmission, but seriously interferes with the voice harmonics or overtones as a result of wave reflection and dissymmetry of wave propagation, due to the position of the secondary impedance in relation to the receiver in the circuit. It is well known by telephone engineers that by shunting out the secondary of high potential coils the efficiency of the receiver is raised by fifty per cent. or more. This again accounts in part for the low-efficiency transmitter induction coils in general use on the long-distance lines of the American Telephone and Telegraph Company.

In Mr. Therrell's invention the essential effective transformation ratio is obtained by tuning the primary circuits for larger currents, which from the expression for secondary electromotive force, $E_2 = 2\pi n M I_1$, gives the same results as would be obtained by increasing the mutual induction M by raising the transformation ratio. Moreover, this is done without interfering with the efficiency of the receiver. In addition to this his work resulted in the discovery that by placing the secondaries of the plurality of the primary circuits already referred to in multiple and relating them to compensating transformers the terminal impedances of the line may be reduced to practically zero and the receiver efficiency improved by about one hundred per cent.

(To be continued.)

SUCCESSFUL MEETING OF THE MAINE INDEPENDENT TELEPHONE ASSOCIATION BRINGS OUT LARGE REPRESENTATION.

AT the annual meeting of the Maine Independent Telephone Association held at Lewiston, Me., about seventy companies were represented. After adopting a constitution the association voted to affiliate itself with the International Independent Telephone Association of America. A telegram was received from Jas. B. Hoge.

The officers elected were: W. H. Park, Portland, president; H. L. Davis, Portland, secretary; E. E. Daicey, Auburn, treasurer.

The next regular meeting will be held at Portland, Me., on Wednesday, September 12, 1906.

SOUTHERN INDIANA TELEPHONE MEN MEET AT EVANSVILLE.

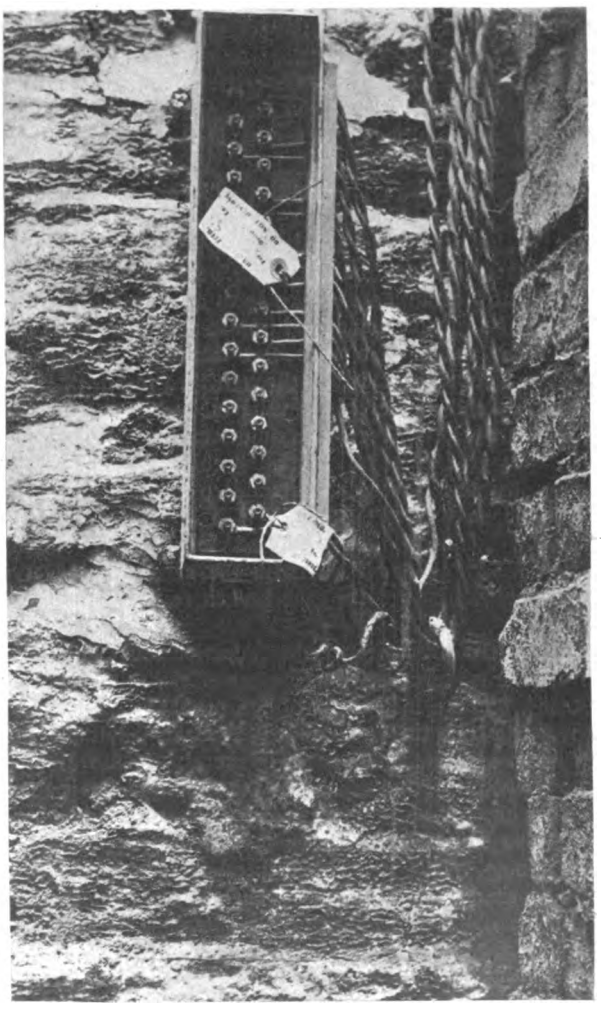
THE third quarterly meeting of the Ninth District of the Indiana Independent Telephone Association was held in Evansville in the office of the Citizens' Telephone Company August 9. The meeting was well attended and interesting. W. H. Moore, manager of the Knox County Home Telephone Company of Vincennes, was elected vice-president in place of W. D. Curll of Petersburg, who has removed to Texas. A flattering resolution testifying to Mr. Curll's zeal and work as an Independent telephone man and offering the good wishes of the association for his success in Texas was adopted.

After the business of the association was concluded, the Citizens' Telephone Company, which is asking for a franchise in Evansville, entertained the delegates. The next meeting will be held in Vincennes on the first Thursday in November. A good programe will be prepared by the programe committee consisting of C. F. Stevens, secretary of the Princeton Telephone Company, and C. H. Webb, president and general manager of the Pike County Telephone Company.

SOME FEATURES OF INTERIOR BLOCK DISTRIBUTION ON MANHATTAN ISLAND.

(Continued from page 100.)

threaded for standard brass nipples. These openings enable the dry core cables to enter the box direct from either end without the use of wool cable or pot heads, and without the customary loop where filled cable is used. When the cable enters the top of the box a standard plug is used to close the opening in the bottom and vice versa. Brass lugs are used, which are mounted in a hard rubber strip, with the stems protruding from each side, threaded and provided with washers and standard hexagon nuts inside and out. The wires of the dry core cable are connected to the lugs on the inside of the strip, then the strip is tightly fastened by means of screws to a gasket made in the box; the sheathing of the cable is wiped to the nipple, after which the box is turned upside down to be filled with compound through the opening in the other end. A slot in the right hand side of the box, over which is fitted a wooden strip drilled for the same number of wires as its capacity, provides for the entrance of the twisted paired wires to the lugs.



Junction Box Shown in Preceding View, Opened by Turning the Cover Upward, Exposing Wires for Inspection or Test.

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QUERIES

CONDENSER ACROSS TERMINALS OF REPEATING COIL.—(747.)

On certain circuits which I have seen there is a repeating coil which carries battery to the line strands of the cord circuit. This coil is wound in four sets of turns, two of which are connected to one side of the cord circuit and two to the other. Between the two connected to the side of the cord circuit which is to be connected to the local subscriber is joined up a battery for transmitter supply. Directly between the two terminals of this coil to which battery is attached, that is to say, bridging the battery, is placed a condenser. Will you kindly inform me what use this condenser has in the circuit as it is placed? R. N.

It has been found that the use of a condenser in the circuit as you mention provides a good path for the alternating voice currents. These find a complete circuit through the repeating coil and condenser, and much more efficient transmission is obtained than if these currents were forced to go through battery. On the other hand, the battery current will not pass through the condenser so no change is noticed in the conditions for direct current supply by cutting in a condenser across the battery terminals.

KICK COIL.—(748.)

I wish you would please explain to me the reason for giving to the kick coil the name it has. N. O.

The kick coil probably receives its name from the fact that when its circuit is opened, if a person happens to bridge the suddenly opened portion with his hands he receives a very sharp and annoying shock. The suggestion is quite clear. This action is due to the fact that the kick coil has a considerable amount of iron in the core and the windings produce a strong magnetic field. When the circuit is broken the field is destroyed, and the magnetic lines of force instantly collapse, cutting the turns of wire wound about the core. This of course creates a very high potential in the wire which prolongs the current, and this current is so strong as to cause a spark to pass over a gap of moderate length, or produce a most disagreeable impression upon any person who receives it through his body.

DISCONNECTION ON SINGLE SUPERVISORY.—(749.)

Is it considered good practice to allow an operator to pull down a connection when only one supervisory lamp is lighted, or should she wait until both subscribers have hung up? If the latter, is it advisable for her to cut in on the cords if one lamp remains lighted longer than the other to see if the second person wishes a new connection; that is, provided the lamp is not flashed? O. G.

There is considerable difference of opinion on this subject, and a correct answer to the question would depend to a very large extent upon the loads the operators are carrying. If they are answering a great many calls per hour at each position, and you aim to give very rapid service, there is no doubt that the single lamp disconnection will give very good results as soon as your subscribers are accustomed to it. Under this plan, of course, it is customary for the operator to take down the cords as soon as the calling subscriber's lamp, by its illumination, indicates that he has hung up his receiver. This is for the reason that the responsibility of originating the call is his, and that therefore he is the proper person to terminate the conversation. If the other subscriber wishes to originate a call, or get back the person calling him, it should in either event pass as a new call and be handled by the operator who regularly answers this line. A disconnect on a double supervisory system gives the subscriber a little more time and may enable the company to avoid a very small number of complaints which would come in on the one signal disconnection, but the service can never be made so rapid.

The object of having two supervisories is to make it possible for the operator to handle her connections without cutting in on the circuit. It is considered good practice to cut listening supervision entirely out of the operating routine on boards having double supervision, and there seems to be no good reason why this should not apply even when the instructions are to disconnect on one lamp.

PROPER SIZE OF LINE WIRE.—(750.)

We should like to know if it is considered good practice to use No. 14 iron wire for rural line construction? J. B. R.

There is little doubt that in certain Southern states, where no severe weather conditions are found, No. 14 iron wire would stand up fairly well on rural lines. It is an open question, however, whether this would be economical in the long run. If there is any possibility whatever of the wire being subjected to strain, as from falling branches of trees, etc., it would certainly be inadvisable to use it. In the Northern states the wire must be able to stand possible accumulations of sleet, heavy wind pressure, etc. It has been found that the proportion of damage done where No. 14 wire is used is much heavier than where the larger size is strung. It would seem that if No. 14 is to be used at all, for the purpose of bringing about economy, it should be confined to very short runs, such as house drops, etc.

CIRCUIT FOR TALKING TO LOCAL BATTERY OR COMMON BATTERY INSTRUMENTS.—(751.)

In some of our exchanges desks are supplied with a telephone circuit carrying battery permanently. From other desks it is required to talk to these sets, and also to talk to local subscribers through special circuits, which do not carry battery. As battery must apparently be supplied to the transmitters at the subscribers' stations from the cord circuit at the desk, and this circuit is the same one used for talking to instruments which are practically equipped with local battery, I do not see how the conditions agree. Can you give me a circuit which will accomplish this? P. F.

In the circuit shown in Fig. 751 when the key X is operated battery will be fed to a subscriber's instrument over a local trunk. If the key is unoperated transmission is effected from a

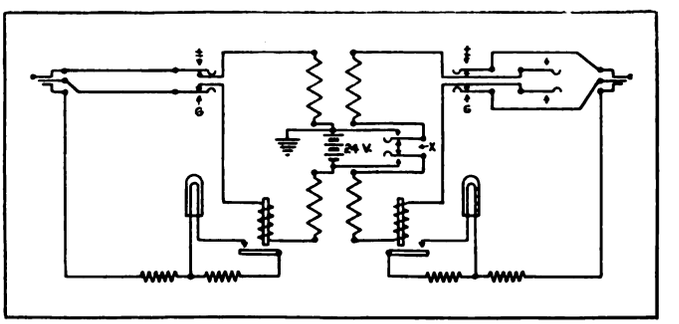

Fig. 751.

local battery instrument through the repeating coil, the circuit of which is closed through the inner contacts of the key.

AVOIDING SPARK AT RELAY CONTACTS.—(752.)

Will you please explain to me how I may get rid of a heavy kick on a circuit in which there is a retardation coil in series with battery and the armature and contact of a relay? Every time the circuit is opened a spark passes across the relay contacts and blackens them. Is there any way in which this may be prevented? J. B. N.

It is usually found that bridging the relay contacts with a condenser will do away with the difficulty of sparking across the gap. All that is necessary is to solder the condenser terminal wires to the armature and contact terminals of the relay respectively, using preferably a condenser of small capacity. The spark is due to a sudden rush of current, produced by the self induction of the retardation coil in the circuit. This causes a sufficient difference of potential between the two sides of the gap made by the relay to force a spark across from one side to the other. The insertion of the condenser, however, provides a means of storing up this difference of potential, if the condenser is properly proportioned to the inductance in the main circuit and the space between the contacts when the circuit is opened.

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THE EDITOR'S PAGE

VACATIONS FOR OPERATORS.

LARGE companies find that the giving of vacations to their entire operating force makes a serious expense, but this can hardly be helped. In most cases they are willing to give their employees this benefit without question, and some organizations have found a way to bestow additional favors that are appreciated by the operators and do not increase the vacation pay roll.

When a company operates exchanges in both cities and small towns it usually occurs that business in the large exchanges falls off to a certain extent during the hot weather. If the entire operating force is to be retained to be ready for the rush of business in the autumn the switchboard positions are likely to be handled at low efficiency. A certain number of operators can well be spared from these central offices without in any way detracting from the quality of the service furnished the subscribers.

In the country exchanges when an operator takes a vacation a substitute must be found. The transfer of an operator from a city exchange solves the problem without causing duplication of the pay roll for the small town. Where it has been possible to put this in practice the company has been able to offer its city employees a change which is very gratifying to them, and at the same time helps reduce the extra vacation expense.

COMPULSORY USE OF THE TELEPHONE.

ENFORCEMENT of a law compelling railways to maintain telephones in their stations for the giving of information to the public is to be undertaken by the State of Virginia. This marks an important step not only in the way of increasing the conveniences at the disposal of the traveling public, but as a recognition of the extremely important place which the telephone has taken as an every-day necessity.

The New York Central lines some time ago were progressive enough to recognize that the last moments before departure on a journey are likely to bring a realization of the desirability for conveying a message to a point some distance from the station. The telephone offers the only known method of communication which permits the traveler to receive an immediate reply, and its installation was decided upon. What is more, this company carried the plan to its logical conclusion and arranged for connection between its most important trains and the central offices in the terminal cities. Another prominent example of the use of the telephone by railway passengers was given when the members of the Board of Trade of a large southern city had connections put up from the train to their own city for the carrying on of toll conversations from each stopping place during a tour of the state. In both of these instances much satisfaction has been expressed by those who have profited from this service. These may be taken as practical demonstrations of the argument that the telephone will be appreciated by those who wish to send outgoing messages from the premises of the railway companies.

The desirability of direct communication with stations for obtaining information concerning rates and train service is agreed upon as a matter of every-day experience. The occasional traveler is rarely provided with a time table, and in the absence of telephone connection the only thing to do is to send out and get one. How much easier it is to remove the receiver from the hook and within half a minute learn just what time the train leaves!

The freight houses, too, come in for their share of attention. If the grocer or the butcher gets an order in the morning for something which is out of stock, it is so much better for him to call up and find it at the freight house than to make roundabout inquiries, or a search, that the line is sure to be well patronized. These railway station telephones will benefit more people, and in more ways, than would be suspected from a hasty consideration of the matter.

Doubtless this plan will interfere somewhat with the station routine, and be resisted by those railroads which are inclined to deal with the public according to the maxim said to have been so vigorously expressed by the elder Vanderbilt. It is to be hoped, however, that if compulsory measures are necessary other states will not lag too far behind Virginia in the enactment of laws which will bring into effect a method of saving minutes to people at the moment when time is most valuable.

COIN BOX POLICY.

SOME telephone companies which have coin box pay stations do not seem to realize fully the responsibilities which go with maintaining a telephone in a public place. It is by no means unusual to have a message refused on account of failure to deposit a coin when such an act is impossible, and due to no fault of the person who wishes to use the telephone. When this subjects the person who wishes to talk to a really serious inconvenience there is usually a protest which should bring to the official mind the occasional desirability of a flexible interpretation of protective regulations.

In the first place the most efficient maintenance of such pay stations should be enforced. They are as frequently as not used by persons who, although infrequent users of the telephone, can be educated up to the point of becoming regular subscribers. They should therefore be favored with the best possible service, in order that they may be impressed with its value. Again, if the box happens to be out of order through the company's negligence, it is a rather broad question whether or not the company is fully justified in refusing a message when payment cannot be made in the regular way. The results of such refusals seem to point to the desirability of permitting the manager to authorize the waiving of payment in exceptional cases. As a question of policy this would have its advantages in the avoidance of publicity of an undesirable nature. Perhaps a better remedy would be to have the service, if installed at all, sufficiently well developed as to make it available from several places in each vicinity.

HARVESTING BY TELEPHONE.

IN Kansas they appreciate the value of the telephone. Just now the principal occupation in the rural sections is harvesting, and this work has to be carried on with a rush. One man has a threshing outfit which he is moving on from place to place to take care of the work which must be done, and he finds that the telephone easily increases the amount he can accomplish.

His outfit is so large that a considerable number of men must be carried along and cared for each day, so at each farmer's premises he sets up a cook's shack. As the country is covered with a network of rural lines it is a simple matter to connect a telephone in the shack to the wires and be in constant communication with butchers, grocers and other supply houses.

The owner of the outfit can call up any of the men with whom he wishes to talk business, and the next man on the list can find out just when his turn is to come. The rural lines seem to be bringing out fully as many new uses for the telephone as the cities, and it all helps to extend the service.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

EFFECT OF PROPERTY TRANSFER IN TERMINATING RIGHT OF WAY.

I desire to secure a form for the consent for a private right of way for a telephone company's pole line on property within city limits, although for the most part farm land. Please let me know whether any recent decision of the Court of Appeals says that such right of way terminates with the transfer of the property. I believe such a case in New York City has been noted in your department. If you can give me any information which would be of use in drawing up the above mentioned rights of way, or loan for one day such form, I would be very grateful if you should do so. I write you because I understand that the required form has been somewhat modified recently. R. S. O.

THE editor does not know of any recent decision of the Court of Appeals of New York holding that a right of way terminates with a transfer of the property. The court would scarcely make such a holding because it would not be in accordance with the principles of law. A person buying a piece of property over which a telephone company had a right of way from the presence of the telephone poles would take the land subject to whatever burdens existed upon it in favor of the telephone company.

For consent for a private right of way, there is no required form. A consent should be witnessed and acknowledged in accordance with the laws governing the transfer of real property, but instead of reciting a deed of the property, should merely recite a deed of the right of way. In case the property owner would be reluctant to sign a consent with the formalities of a deed, an informal paper might be prepared simply stating that John Smith grants to the telephone company a right of way for the purposes desired (enumerating them with considerable care) over the land in question, which should be accurately described. If the company, after the execution of this consent by the property owner, acts in accordance with it, and erects its line across his property, he would afterwards be estopped from withdrawing his consent. The first method suggested is the preferable, as the instrument can then be recorded.

TELEPHONE LINES ARE AN ADDITIONAL SERVITUDE IN NORTH DAKOTA.

SUIT was brought against the Tri-State Telephone & Telegraph Company to enjoin it from constructing and operating a long distance telephone line on a rural highway in Grand Forks County, North Dakota. The defendant was a foreign corporation regularly authorized to do business in the State. It obtained the consent of the township supervisors to construct the line in question, but did not obtain the consent of the plaintiffs, who were abutting owners, nor compensate them for the taking of the property, nor institute condemnation proceedings. The plaintiffs alleged that the acts of the company were in violation of section fourteen of the State constitution which provided against taking or damaging private property for public use, or appropriating a right of way to the use of any corporation, other than municipal, without just compensation. The court found that the controlling question in the case was whether the construction of a telephone and telegraph line upon a rural highway constitutes an additional servitude upon the fee of the abutting owner. The trial court held that it did not and the attorneys for the company in support of this conclusion urged two grounds: First, that the maintenance of the line was a proper highway use within the purpose of the grant of the easement; and second that, irrespective of the question as to whether it is a proper highway use, the company had the right to use it under the authority of sections 5263 and 5264, Rev. St. U. S. The Supreme Court overruled both contentions and reversed the decision holding that the plaintiffs were entitled to compensation. The court said: "If telephone companies require the use of private property for the construction of their lines, they have the power of acquiring it by condemnation, but they may not, in our opinion, lawfully take it without first making compensation." The company's other contention was that the highway was a post road under the acts of Congress above cited. The highway was upon a section line and became such by grant of Congress to, and acceptance by, the public before the land was patented to the plaintiff. The company had filed written acceptance and been granted permission to construct and operate its line over the road in question. The court held that the sections which authorized the construction of telegraph lines along post roads did not affect the right of a land owner to the damages to which he is entitled for the additional burden upon the fee caused by the erection of telegraph poles upon a public highway, which is a post road. Cosgriff v. Tri State State Telep. & Teleg. Co. 107 N. W. 525.

MISSISSIPPI TELEPHONE COMPANIES CANNOT CONDEMN RIGHTS OF WAY.

THE Cumberland Telephone & Telegraph Company, a Kentucky corporation, instituted proceedings in a court of the justice of the peace in Hinds County, Miss., for the purpose of condemning a right of way for itself along the right of way of the Alabama and Vicksburg R. R. Company, between Jackson and Meridian. The railroad company brought suit for an injunction to restrain the condemnation proceedings. Before the case was heard the Mississippi Telegraph Company, a Mississippi corporation, instituted suit before the same justice of the peace for the same purpose, and the railroad company filed a supplemental bill for the purpose of also getting an injunction against the Mississippi Telegraph Company, alleging that it was a mere dummy company, acting as a cover for the Cumberland Telephone & Telegraph Company. The contention of the railroad company was that the Cumberland Company had no authority under the laws of the State to exercise the right of eminent domain. The Cumberland company based its right of eminent domain on Section 195 of the Constitution of the State, declaring telephone companies to be common carriers. The court held that whatever might be the true rule of interpretation as to whether the phrase "telegraph company" necessarily embraces "telephone company" as held by many authorities in the State of Mississippi, telegraph companies and telephone companies are treated as separate and distinct companies. The court found nothing in the constitutional provisions referred to which conferred upon telephone companies any authority to exercise the right of eminent domain. It therefore granted a decree restraining the Cumberland company from proceeding with its condemnation proceedings.

As to the allegation that the Mississippi Telegraph Company was merely a cover for the Cumberland Company, it was held that this question was one to be inquired into only by the State, and could not be raised by the railroad company in this proceeding. The injunction was therefore dissolved as against the Mississippi Telegraph Company. Alabama & C. Ry. Co. v. Cumberland Telep. & Teleg. Co., 41 Southern 258.

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IN THE OPERATING FIELD

POSSIBILITY THAT TELEPHONE FRANCHISE WILL BE SUBMITTED TO POPULAR VOTE AT OMAHA.

THE City Council at Omaha seems to think that the proper solution of the city's telephone troubles is to compel the Nebraska Bell Telephone Company to allow the Independents to make connections between their subscribers located in the surrounding country and the subscribers of the Nebraska company over the lines of the latter organization. This right, as may be expected, the Nebraska company has refused to grant. Other concessions were asked for by the city, and these were also refused. There are at present three propositions for Independent franchises before the Council, and an effort is being made to get the situation before the public and let it be decided by general vote.

THREATENED COMPETITION AT SARANAC LAKE, N. Y., CAUSES THE BELL COMPANY TO WAKE UP.

THE village of Saranac Lake in upper New York is very much stirred up at the present time over the telephone situation. It seems that a short time ago an Independent company obtained the right to enter the village with its lines, and the people were very much disturbed by the idea of having workmen stringing wires upon the streets and interfering with the trees, etc. They were, however, prepared to undergo this annoyance at the hands of the Independent company for the benefits which were to be conferred.

Now that a rival company has come upon the field, the Bell people, who operate an exchange in the town, have suddenly awakened, and they too are rushing men and material upon the ground. As a result the residents of the little town are said to be seeing more activity in telephone construction crowded into a space of a few weeks than they have ever known to be brought about by all their efforts to obtain improvements in the time the company has been operating.

HAWKEYE, IA., TELEPHONE COMPANY INCREASES CAPACITY OF SWITCHBOARD.

BECAUSE of rapidly increasing business the Hawkeye Telephone Company has found it necessary to install another section on its switchboard, thus increasing the capacity of the local board from four hundred lines to five hundred and fifty lines. The local board was filled some time ago, so that it was necessary to put the new lines on the toll board. These will be transferred to the new section, which has been received and is to be installed immediately. The company has three hundred and sixty telephones in Indianola, and about four hundred in the surrounding country, making a total of seven hundred and sixty telephones connected with the Indianola exchange.

The toll rate to Des Moines has been reduced from a flat rate of twenty cents to fifteen cents for a three minute talk, extra charge being made for overtime. The company expects enough increase in the numbers of conversations to more than make up for the reduction in the rate.

FARMERS OF WHITMAN COUNTY, WASHINGTON, TURN DOWN THE PACIFIC STATES COMPANY.

FROM Pullman, Washington, comes the information that the Pacific States Telephone Company has completely failed in its attempts to ensnare the farmers of Whitman County.

It is interesting to note how similar are the tactics employed by the monopoly wherever it has a foothold. Recently representatives of the Bell company met the members of the Whelan Rural Telephone Company at Rose Creek schoolhouse. Here efforts were made to convince the farmers that the rural systems of the county were trying to consolidate and form a "monopoly" which would have them at its mercy! After the proposition of the Bell representatives had been rejected, the farmers voted to extend their systems and improve the service. It is expected that connection will soon be made between all the rural lines and the Independent exchange which is now being built at Spokane.

At another meeting held in the Clinton schoolhouse, six miles southeast of Pullman, the proposition of the Pacific States company offering to give a service for $1 per year was rejected by a vote of 11 to 4.

THE CANADIAN INDEPENDENT TELEPHONE ASSOCIATION WILL HOLD CONVENTION ON SEPTEMBER 5TH.

WEDNESDAY, September 5, has been set as the date for the convention of the Canadian Independent Telephone Association, to be held at the City Hall, Toronto, Ont. Many men representing numerous Canadian companies in different provinces have already signified their intention to attend this meeting. It is expected that James B. Hoge and J. A. Harney, president and assistant secretary, respectively, of the International Independent Telephone Association, will be present to address the delegates.

Owing to the extraordinary activity in telephone competition which has already begun, and which will continue with increasing vigor during the coming year, it is of the utmost importance that all Independent telephone men who find it possible should attend this meeting. Particulars with regard to the convention may be obtained from the secretary of the association, A. F. Wilson, Markham, Ont., Can.

REMODELLED EXCHANGE AT PITTSTON, PENNSYLVANIA, WILL SOON BE PROVIDED BY THE CONSOLIDATED TELEPHONE COMPANIES.

MANY improvements are to be made at Pittston, Pa., by the Consolidated Telephone Companies of Pennsylvania. Not only will new pole lines be built, new cable installed, but the exchange will be moved to a building fitted with every convenience, where a new switchboard will be installed. Selective signalling is to be used on all party lines. New toll lines to Wilkes-Barre and Scranton will provide for the satisfactory handling of the company's long distance business. General Superintendent Charles West has been in Pittston making arrangements for the reconstruction, and it is expected that work will begin at an early date.

PHYSICIANS STAND OUT AGAINST DOUBLE RAISE OF RATES BY BELL COMPANY.

PHYSICIANS in Fayette, Miss., are having trouble with the Cumberland Telephone Company. In 1899, when the Cumberland company sought a franchise in Fayette and was soliciting subscriptions to its service, each of the physicians involved in the present disagreement subscribed at the rate asked —$1.50 per month for a telephone at his residence.

Some months ago it is said that the company proposed to all subscribers of the Fayette Exchange to put in long-distance transmitters instead of the antiquated j[illegible] then in use. An advanced rate of 15 cents per month was to be charged and each of the physicians involved in the present [illegible] agreed to pay the advance for the improved service.

Recently the telephone company instructed the Fayette manager to charge office rates for all telephones in residences of physicians unless they would subscribe for telephones at their offices

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also. The doctors refused to pay the price of additional telephones and have received bills for $2.75 (the office rates) for their residence telephones, which all declined to pay, whereupon the company discontinued their service. It is believed that an interesting damage suit will follow, the result of which will be of importance to every community in the State where the Cumberland company operates.

ATTENDANCE AT THE CONVENTION OF THE NEW YORK STATE ASSOCIATION TO BE THE LARGEST ON RECORD.

THE telephone men of New York State intend to make the Labor Day convention at Niagara Falls one of the big Independent features of the year. The State has been rapidly forging ahead, and the men who are building up its business have demonstrated their ability to take their places among the leaders of the Independent movement. The growth of their plants has been extremely rapid, with the introduction of the most advanced methods of construction and operating as well as of getting business under way in nearly all parts of the State.

The men who are doing this work are especially enthusiastic and realize that the time has come when they must all get together and push the Independent development throughout the State as a whole, in order to make the growth as rapid as possible. Secretary R. M. Eaton, of Niagara Falls, where the convention will be held, has endeavored to reach the president and manager of every Independent company in the State with a direct invitation to attend the convention. It is hoped by all the members that no one who is eligible will neglect the opportunity. Every effort has been made to procure most interesting papers by the best informed men in the field, and it is well understood that visitors will not lack for entertainment to make the time spent at Niagara Falls enjoyable as well as profitable.

Low railway rates which may be obtained for the trip make it especially easy to attend the convention. From present indications it seems safe to predict that practically all the men who are taking an active interest in the Independent development of the State will be present and help to make a first class showing for New York.

VIRGINIA CORPORATION COMMISSION REQUIRES RAILROADS TO HAVE TELEPHONE CONNECTION.

THE State Corporation Commission of Virginia has issued an order which reads as follows:

"Whereas by an act of the General Assembly of Virginia, entitled 'An act to require railroad companies under certain conditions to maintain telephones in their public offices,' approved March 17, 1906, it was enacted by the General Assembly of Virginia as follows:

"'1. That it shall be the duty of every railroad company having a ticket office or freight office in any city or town of this Commonwealth * * * or at any place where telephone connection may be had, on reasonably moderate terms, with one or more telephone exchanges not more than twenty-five miles distant from each place, to constantly maintain in each of such offices, direct telephone connection with each of such exchanges; * * * such railroad company shall cause to be promptly answered all calls made over such telephone connection during business hours. * * * Such railroad company shall cause prompt and correct replies to be made to all reasonable and proper inquiries received over such connection during business hours, concerning the passenger or freight service of such road.

"'2. The term business hours, as used in this act, shall be construed to mean such times as the office or depot be open * * * for the transaction of business.

"'3. The State Corporation Commission shall * * * enforce the performance of the foregoing duties by each railroad company doing business in this State; provided, that the State Corporation Commission may, on the application of any railroad company * * * excuse such company from placing a telephone in any office, depot or place where, in the opinion of the commission, the public convenience does not require it.'

* * * "It is now and hereby ordered by the Virginia State Corporation Commission that each and every railroad company * * * shall * * * not later than the first day of September, 1906, comply fully with the requirements of the said statute under penalty of being fined by the commission such sums, for each offense, as is authorized or provided by law."

PICNIC HELD BY THE INDEPENDENT TELEPHONE PEOPLE OF BANFIELD, MICH.

ON the 9th of August the subscribers and stockholders of the Citizens' Telephone Company of Banfield met for for their first annual picnic. The company is composed of farmers living in the southeastern part of Barry County, and has about 200 subscribers. Its lines are connected with a copper toll line which runs from Battle Creek to Hastings, owned by the Citizens Telephone Company, of Grand Rapids. By means of this line the subscribers of the Banfield company are able to reach all the other Independent subscribers in Michigan and adjoining States. The officers of the company are: Dr. O. R. Cooper, president; J. E. Chandler, secretary; J. F. Merrill, treasurer.

Nearly all the people connected with the company met at Fine Lake. The picnic was opened by a song sung to the tune of "My Country, 'Tis of Thee" with words as follows:

My 'Phone, it is of thee,
Blest type of liberty,
Of thee we sing.
'Phone that has well been tried,
'Phone of the people's pride,
From morn till eventide
Let praises ring.

Here's to its grand success,
May every home possess
One of its type.
May it for freedom stand,
May it in this broad land
Be IT on every hand,
For evermore.

During the remainder of the picnic talks were given by the following gentlemen connected with the local company and some of its friends from neighboring States:

Dr. O. F. Cooper, president: Address of Welcome.

E. B. Fisher, secretary Citizens Telephone Company, Grand Rapids, Mich.: "Value of Independent Telephone Stocks and Why We Are Independent."

J. E. Chandler, secretary Citizens Telephone Company, of Banfield, paper: "Promoting and Maintaining Rural Telephone Companies."

C. E. Tarte, general manager Citizens Telephone Company, Grand Rapids, Mich.: "What We Think of Our Farmer Friends."

J. F. Merrill, treasurer Citizens Telephone Company of Banfield: "Value of Paying Rentals in Advance, and Importance of Paying Toll Bills Each Month."

J. E. McElwain, manager Citizens Telephone Company, Hastings, Mich.: "Our Neighbors."

A. A. Burch, manager Citizens Telephone Company, of Battle Creek: "What I Came For."

A. M. Edmunds, vice-president Citizens Telephone Company, of Banfield: "The Value of the Telephone to the Farmer."

The gathering was a very large one, and all who were present were very much pleased with the success of this first meeting.

SUBMARINE TELEPHONE TESTS BEING MADE IN GERMANY.

REPORTS from Berlin state that experiments are now being made at Lake Constance with a submarine telephone constructed under Professor Pupin's system. The cable connects Friedrichshafen, in Wurtemberg, and Romanshorn, on the opposite (southern) shore, in Switzerland, about seven miles distant, and reaches a maximum depth of 820 feet.

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TELEPHONE PATENTS

METER SYSTEM.

Clarence E. Wright, Cleveland Ohio, patents (No. 818,068; dated April 17, 1906; filed January 19, 1905; serial No. 241,876) and assigns to David A. Yoder, Toledo, Ohio, a meter system.

This invention relates to registering apparatus for telephone exchanges and provides means for the registration of both the number of calls received by an operator and the elapsed time occupied by her in making connections and disconnections.

These results are obtained by special mechanism located at the exchange and consisting of a counting device and a timing device associated with each operator's position. The counting device registers the number of calls; and the timing device can by means of a switch be so connected as to record the total time consumed by an operator either in making connections, or disconnections from one call or any number of calls.

TRANSMITTER ARM.

Herbert L. Knight, Cleveland, O., patents (No. 823,336; dated June 12, 1906; filed July 28, 1905; serial No. 271,581) and assigns to the Williams-Abbott Electric Company, of Cleveland, O., a transmitter arm.

This invention provides for a hollow reinforced transmitter arm which may be made from a single steel stamping, and for a base of similar construction. The arm has but a single seam which is underneath and out of sight. It is designed to be internally reinforced at its inner end, where a pivotal construction embodying two dished washers distributes the strain about the pivot and makes it possible to secure a satisfactory frictional adjustment for holding the arm in any position.

MEASURED SERVICE SYSTEM FOR TELEPHONE EXCHANGES.

Charles E. Scribner, Jericho, Vt., patents (No. 825,424; filed February 23, 1904; serial No. 244,355), and assigns to the Western Electric Company, Chicago, Ill., a measured service system for telephone exchanges.

This invention provides for a measured service system in which

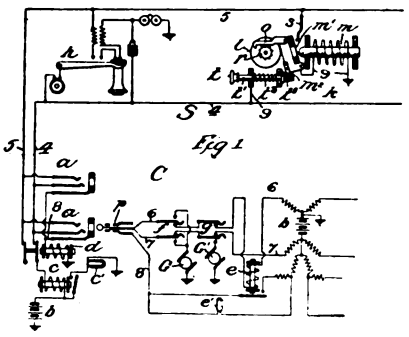

Fig 1

the registering train is returned to its initial position in case the connection called for is not obtained or proves unsatisfactory.

Referring to Fig. 1 two keys, *f* and *g* in the operator's cord circuit control the apparatus at the substation *S*. The details of the apparatus are shown in Fig. 2 and Fig. 3.

When a subscriber wishes to use the telephone he pushes the switch key *t*, completing a branch circuit from the limb 4 of the line and the battery *b*, through wire 9, the metallic portion of key *t*, the armature and the magnet of the meter *m* to ground. This causes the display of the line signal *c'*, but the current is insufficient to attract the armature *m'*.

After the "disconnect signal" has been received by the operator,

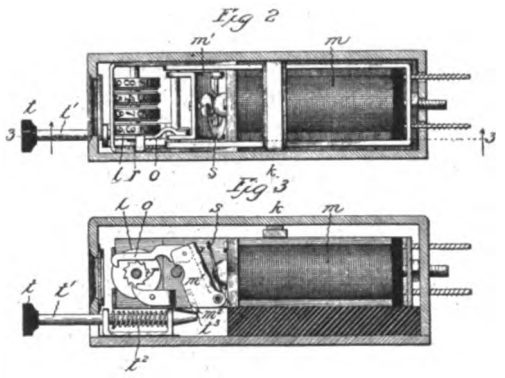

Fig 2

Fig 3

if the connection has been unsatisfactory she operates key *g* and current from generator *G'* flows through circuit 9 as did the battery current, but being stronger causes the magnet *m'* to attract its armature. Current through circuit 9 cannot, however, operate the registering train, for before the pawl *o* engages the ratchet the key *t* is released and springs back, breaking the connection at t^3 and restoring the mechanism to its original position.

If the operator wishes to register a call the key *f* is depressed and current from generator *G* is sent over both sides of the line, so that although the key *t* springs back, as in the other case, this is not brought about until the contact established at *s* affords an alternative path for current to energize the magnet, and the continued motion of the armature advances the train.

The inventor claims that it is an essential advantage of this system that it is identical in its central station equipment with the system of Patent No. 665,874, issued January 15, 1901, to A. M. Bullard and may be used with that system where both coin collectors and registering meters are desirable on the same line.

SELECTIVE TELEPHONE.

Noble S. McKinsey and Anton R. Nelson, Susanville, Cal., pat- the system of Patent No. 665,874, issued January 15, 1901, to serial No. 238,276).

The object of this patent is to provide for secrecy on a selective calling circuit which may or may not embrace more than one line terminating at an exchange. This the inventor accomplishes by mechanism consisting of gears, springs and magnets located in each instrument.

DESK STAND.

Henry Lideman, Menominee, Mich., patents (No. 816,619; dated April 3, 1906; filed September 14, 1905; serial No. 278,384) a telephone desk stand.

The object of this invention is to provide a means whereby the hook mechanism mounted within the supporting column of a desk stand may be readily examined for repairs. This the inventor accomplishes by making the column of two vertical parts, one of which serves to support the switch mechanism and hook and is permanently attached to the base and head of the stand.

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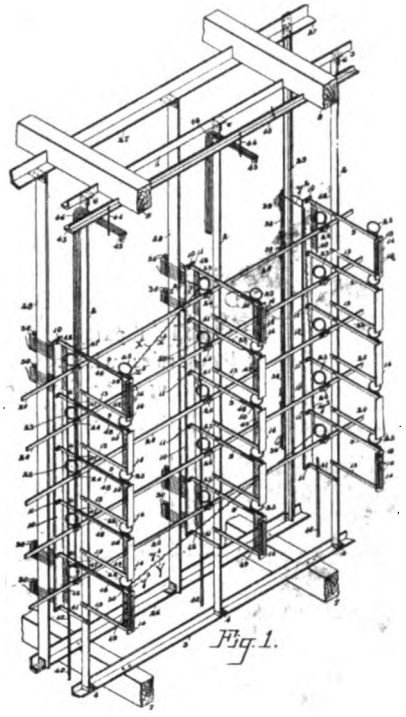
The other portion is attached to the permanent part of the standard by screws or other suitable means. The removal of this detachable portion of the column exposes the contents in such a manner as to make them readily accessible.

DISTRIBUTING BOARD.

Franz J. Dommerque, Chicago, Ill., patents (No. 822,590; dated June 5, 1906; filed Oct. 11, 1902; serial No. 126,877) and assigns



to Kellogg Switchboard and Supply Company, Chicago, Ill., a distributing board.

The object of the inventor is to provide a distributing board which shall be adapted for use where both underground cables and aerial lines are installed, in that lightning arresters need only be used in connection with the aerial lines. In the board described the arresters are mounted on an auxiliary frame which is mechanically distinct and electrically insulated from the main frame. Referring to Fig. 1 the construction of the main frame is as follows: The horizontal angles 3 and 5 engage the floor and ceiling respectively and support the vertical angles 2 on which are mounted pairs of strips 9 and 13 which carry terminal strips 14 and jumper strips 10. The auxiliary frame is provided with vertical strips of two forms 28 and 29. Strips 28 are flat bars of rectangular section and support the arrester 30 for the aerial lines. Strips 29 are T bars adapted to carry simple connection strips for cable lines.

INTERCOMMUNICATING SYSTEM.

Richard M. Beard, New York, N. Y., patents (No. 809,929; dated January 16, 1906; filed November 4, 1902; serial No. 130,054) an intercommunicating system.

In this invention means are disclosed for obtaining secret service between any two stations of a system of this character.

This is accomplished by means of keys which control the local circuit including the telephone apparatus and the signaling devices. In a ten line station there would be nine keys at each instrument, one for each of the foreign points. These keys are each provided with six contacts. The two middle or swinging springs connect with the common return and the direct wire leading to the associated station. The inner contacts lead to drops or signals, of which there is one for each foreign line at each station. The outer contacts are connected to the telephone equipment and signaling generator. Each station is so arranged that it has a direct wire to every other station on the system. Supposing party 3 wished to call 7, he would operate No. 7 switch, which would connect his talking and signaling apparatus to that line. When No. 7 received the signal he would operate key 3 to connect his talking and signaling circuit. If he were already engaged in talking to another party he could either not pay any attention to the call or could operate switch 3 to ask the party to wait, or he could leave it in talking position so that all three parties could talk together.

It will be apparent that before a person can listen on a conversation two operations are necessary, first, that he connect his telephone to the line leading to the station desired, and secondly that the person at that station must connect his local instrument to the circuit by means of the associated key. The keys in a normal position connect the drops to the associated lines.

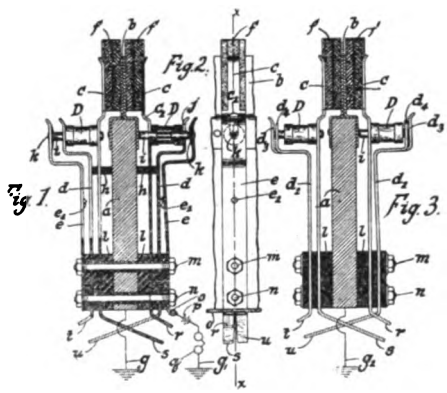
The secret feature of the system is secured by the necessity of dual connections between one station and another. The connecting lines between stations normally terminate at drops. It is therefore not only necessary for a calling subscriber to signal the desired station, but the party at that point must operate the associated key to disconnect the calling line from the drops and connect the local telephone circuit of his instrument to the individual line which leads only to the calling station.

PROTECTIVE APPARATUS.

Frank B. Cook, Chicago, Ill., patents (No. 812,980, dated Feb. 20, 1906; filed Nov. 26, 1904; serial No. 234,359) self-soldering heat coil and protective apparatus.

The inventor describes a heat coil and lightning arrester which is designed to actuate an alarm when the heat coil is operated. Fig. 1 is a section of the device, Fig. 2 a side elevation, and Fig. 3 a modification in which the alarm attachment is omitted. Referring now to Fig. 1, *a* is the metal mounting plate connected to ground and having the clip *b* which forms part of the arrester as shown.

Springs *s* and *r* are line springs, *t* and *u* are switchboard springs. The outer springs *e* are in electrical connection through the bolts *m* and *n*, but are insulated from the heat cartridges *D* by insulating plates *k*. A heavy current fuses the cartridge *D*



and allows the spring *c* to push the pin *i* against the frame *a*, thus grounding the line. The contacts c_1 c_2 at the same time operate the alarm shown at *q*. To reset the device it is only necessary to turn the cartridge end for end and replace it in the clips.

TELEPHONE SYSTEM.

Isidor Kitsee, Philadelphia, Pa., patents (No. 824,032, dated June 19, 1906; filed April 10, 1905; serial No. 254,770) a telephone system.

In this patent is described a system of connections arranged with special reference to long distance use, in which the inventor intends that four wires shall be run between the two exchanges for each line terminating therein. Methods of arranging circuits to secure the results which he desires are referred to in the description.

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IN THE MANUFACTURING FIELD

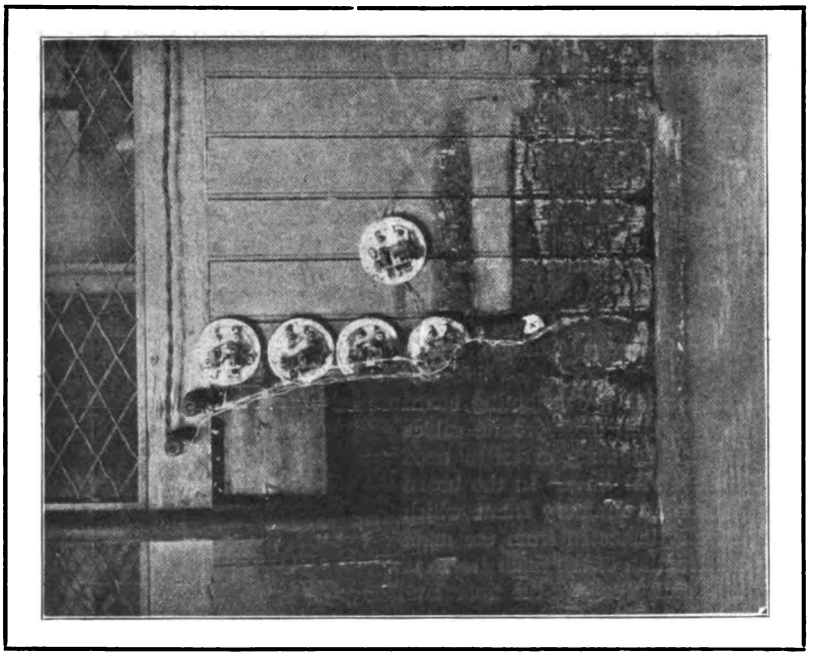
"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

EFFECTS OF HEAVY CURRENTS.

AN example of the danger which arises when an improperly protected telephone line becomes crossed with a source of current at a high potential is shown in the illustration on this page. This was furnished by Frank B. Cook, 238 West Lake street, Chicago, Ill., who gives the following data concerning the accident which preceded the taking of the photograph:

"An underground service telephone connection had been rearranged in a certain district to allow overhead entrance of wires, the instruments being protected within the building by the ordinary carbon cut-out and heat coil combination, but with no provision for heavy current protection. A cross between the telephone wire and trolley circuit some distance away resulted in operation of heat coils, followed by a dead ground on the service at this point, the protector being of the heat coil spring release type; this formed a ready path for the trolley current, which, in the absence of proper fuse protection, was sufficient to overheat the frail connection and ignite the connecting wire coverings. Resultant loss, $3,300."

Mr. Cook has collected from time to time some very interesting and valuable data concerning accidents which have a bearing on the subject of telephone circuit protection. Some of this material has been reprinted in a form suitable for distribution and may be obtained by interested persons who make a request.



Protective apparatus and woodwork burned as a result of cross between telephone and trolley wires.

EQUIPMENT FOR TOPEKA, KAN.

THE American Electric Telephone Co., Englewood, Chicago, Ill., has secured one of the most important contracts of the year. This is from the Topeka Independent Telephone Company, Topeka, Kansas, for the building of its new 10,000 line, multiple, lamp signal, central energy switchboard. The Topeka company intends to operate a great many party lines, and for that reason the number of lines per operator's position is limited to 100. Each position is also equipped with fifteen sets of cord circuits, each including the Amercan company's four-party selective key for permitting the operation of the American company's well-known "high and low frequency selective system."

In addition to furnishing the main exchange switchboard, which will have an initial installation of thirty-nine positions, the contract includes a two-position chief operator's desk, a two-position information and trouble clerk's desk, and a two-position recording desk, which is required to operate in conjunction with the four-section toll line switchboard already installed by the American company in the Topeka company's exchange.

The terminal room equipment consists of an intermediate and main cross-connecting board with a protector rack using the American company's combined carbon and sneak current arrester. The relay rack, cable racks, etc., will also be furnished by the American company.

The power plant consists of a four-panel power and fuse board, together with the necessary ringing and charging machinery. One of the charging machines will be driven by an outside source of electric power, while the remaining charging machine is arranged to be driven by a gas engine.

The contract for the Topeka equipment was awarded to the American company, which in 1900 built the present Topeka central energy switchboard, after a very spirited contest. The circuits adopted for the new switchboard are substantially the same as those contained in the old board, having only two relays in the cord circuit and one relay in the line circuit.

A HANDY CONDENSER.

THE condenser is being used in party line telephones more and more each day by parties who realize the great advantage in being able to ring over the lines without being interfered with by those who have their receivers removed from the hooks.

Before the condenser was used much trouble was experienced by the subscribers on heavily loaded lines. Anybody who listened in while another was trying to ring would absolutely prevent the proper signal from being given.

To illustrate, Smith lives on one end of the line and Jones on the other end, and Brown as well as other subscribers at points between.

Smith rings Jones's number intending to call him up, but Brown, hearing the bell ring, takes down his receiver before the signal is finished; the result is that the signal is cut off at that instant and Jones is not called. It may be that Jones does not respond at the first signal and so Smith rings again. By that time there are so many receivers down that it is impossible to call at all.

If each telephone on the line had a condenser wired into the receiver circuit this trouble would not occur, and it would be possible to ring up the party desired regardless of the number of receivers that were off the hooks.

This little piece of apparatus should nearly double the value of the telephone on rural lines, as it prevents one of the greatest nuisances.

Julius Andrae & Sons Co., 99 W. Water street, Milwaukee, Wisconsin, has a very convenient form of condenser which it is offering to the telephone buyer. It is said to be inexpensive and it requires little time to install, being designed particularly for this purpose.

This company has recently published a large catalogue of its products in which are described series and bridging telephones, switchboards and construction supplies, as well as a full line of tools. It will be sent free to any telephone man on request.

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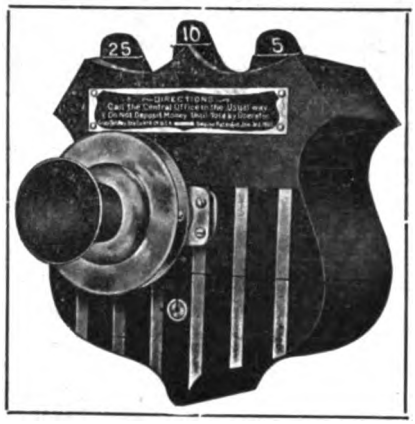
Gray Pay Stations Pay

Our motive has been simplicity, which has made success for the Gray station. Others are adding more movable parts to their already troublesome lever springs, etc.



GRAY TEL. PAY STA. CO. HARTFORD, CONN.

FOR SALE

For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE—Multiple, lamp signal central energy switchboard of latest Stromberg-Carlson make. 1-sec. mag. local, 1-sec. mag. long distance, 4-sec. (120 lines each), central energy. Just from the factory. Not yet unpacked. Terms to suit. Address Piedmont Electric Co., Anderson, S. C. 653

FOR SALE, CHEAP—A number of good, second-hand magneto telephones in excellent condition. Ask us about them. Address The Tuscarawas Co. Telephone Co., New Philadelphia, Ohio. 654

FOR SALE—Common Battery and Magneto Exchange Equipment. The Common Battery and Magneto Central Office plant formerly used by the Citizens' Telephone Company is for sale. The plant consists of local and toll switchboards, main and intermediate frames, relay racks and power plant for 1,000 subscribers' lines. Also common battery and magneto subscribers' station equipment for 1,000 stations. For particulars address Kenosha Home Telephone Co., Kenosha, Wis. 655

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

PURCHASING AGENT large operating company desires change. Five years present position. Excellent record. Energy and ability. Prominent references. Address Box 656, AMERICAN TELEPHONE JOURNAL, New York. 656

DRAUGHTSMEN—Mechanical, electrical, structural, architectural—are at a premium. In a recent issue of "Opportunities," our monthly publication, we listed 104 positions for draughtsmen at salaries of $900-$2,500. Sample copy of "Opportunities" is free for the asking. Hapgoods, 305 Broadway, New York. 464

WANTED—Position by a man acquainted with both theory and practice as Superintendent or Manager. If in need of such a person let me hear. Address Box 664, care THE AMERICAN TELEPHONE JOURNAL, New York. 664

WANTED—One first-class line construction foreman; also four first-class telephone installers and line inspectors. Address Box 659, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 659

RECRUITS DESIRED FOR SIGNAL CORPS, U. S. ARMY—Pay ranges, according to service, home or foreign, from $13 to $90 per month, and in addition rations, quarters, clothing and medical attendance are furnished. The Signal Corps offers unusual opportunities for foreign service and rapid promotion to young men of character, intelligence and ability who have had electrical training. For detailed information write to Chief Signal Officer, U. S. Army, Washington, D. C. 660

TELEPHONE MAN, modern practice all departments, will be open for re-engagement about October 1. Management of progressive Independent properties considered. Address Box 661, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 661

WIRE CHIEF wants position, C. E. plant of three or four thousand telephones. References. Address Box 662, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 662

WANTED—Every wire chief to write for our proposition as a side line. No samples, no time lost from regular work, good pay. Address Jester & Millikan, Marion, Ind. 643

WANTED—Three men who are familiar with the work of cabling telephone exchanges. Attractive position to men who are capable of making plans and figuring lengths of cables. Location, New York City. Address Box 649, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 649

WANTED—Position as manager or superintendent by a practical telephone man; 12 years' experience in the above positions. Married, 31 years of age. Best of recommendations. Address M., 2119-a Cass avenue, St. Louis, Mo. 658

WANTED—Position as manager or superintendent by young man with exceptional ability. Must be an enterprising Independent operating company. Have had eleven years' experience. Address Box 651, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 651

MR. MANAGER: ARE YOUR BOOKS ALL MUDDLED UP AND COLLECTIONS BEHIND?

SEND FOR OUR FREE BOOKLET AND CATALOGUE ABOUT

Telephone Accounting and Filing Systems

DO IT TO-DAY!

N. B. TELL US THE SIZE AND SCOPE OF YOUR EXCHANGE OR SYSTEM. SEND WITH LETTER SAMPLE SHEETS OF THE FORMS AND RECORDS YOU ARE NOW TRYING TO USE, SO THAT WE CAN ADVISE INTELLIGENTLY HOW TO IMPROVE YOUR PRESENT METHODS WITH OUR SPECIAL COPYRIGHTED LABOR SAVING FORMS.

Telephone Systematizing Dept.

THE Edward-Hine Co.

5 and 7 PEARL STREET (EAST) GRAND RAPIDS, MICH. U. S. A.

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IN THE MANUFACTURING FIELD

TRANSPOSITION METHODS.

TROUBLE on lines, as nearly everyone says as a result of his own experience, is found more often at transpositions than at all other points combined. In order to make a transposition which would not increase the liability of the line to "come in trouble," the Peirce Specialty Company, 241 South Jefferson street, Chicago, states that the following ideal characteristics should be secured:

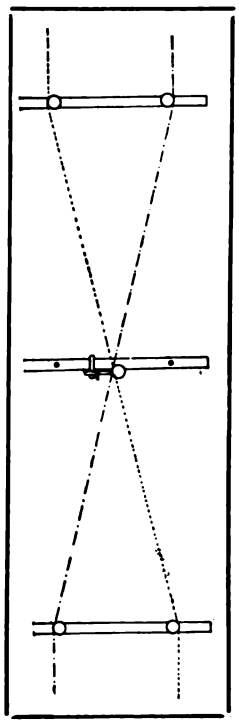

Fig. 3. Plan view of transposition made on Peirce two-pin bracket.

The transposition should be as strong as any other part of the circuit.

In it the wires should have as great a separation as in the balance of the circuit.

It should be no more liable to trouble than any other part of the circuit.

It should be capable of being thrown into a circuit at the time of stringing without the cutting of the wires, and should be so designed that it could be thrown in by the stringing gang instead of a special transposing gang to follow.

It should be so simple when applied either to a single transposition or to any one of the four types of phantom transposition that a mistake could not be made.

The company points out the failure of the old style "cut and dead end" transposition to meet some of these conditions as follows: "It is weak and liable to trouble, necessitates cutting the wires and consequent sleeve joints; the sides of the circuit are brought close together, and it can be made only by an extra transposition gang."

Against the "single pin" transposition are urged only the three objections of the great strain thrown on the single pin in consequence of the fact that both wires exert an angular pull, and the danger of crosses or leakage arising from the small separation, about two inches, between the two sides of the line at the transposition; the third point is that the breakage of an insulator inevitably results in a cross.

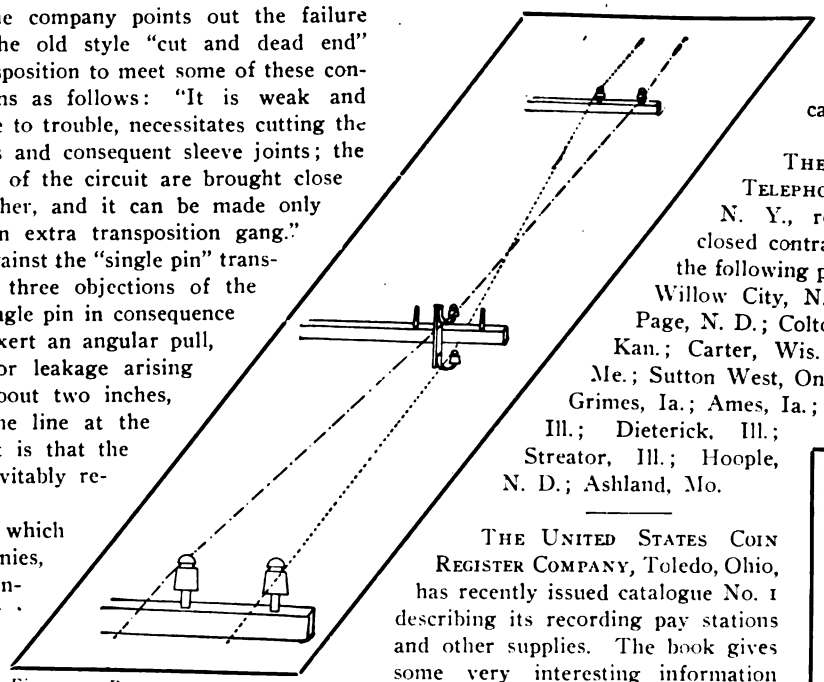

Fig. 2. Perspective view of transposition with Peirce two-pin bracket.

The extra steel pin method, which has been used by some companies, is said to have certain advantages over both the preceding methods. As may be seen from Fig. 1, however, it necessitates delay for the boring of the arm, is not adapted to resist a side strain, and is unsightly.

The new "Peirce Method" which is described is made by using a special bracket, of the shape shown in Fig. 4. The perspective view, Fig. 2, and the plan, Fig. 3, show the method of mounting the bracket and running in the transposition. For this method the following advantages are claimed: "It is strong, safe, simple, sightly and cheap. It can be thrown in by the stringing gang; it necessitates no cutting of wires."

The brackets are made of angle and channel steel, galvanized and equipped with a special bracket end to take the threaded insulator.

The company has issued a very interesting booklet giving general information on the transposition of regular and phantom circuits, and describing the appliances which it sells. This may be obtained on request.

THE AUTOMATIC ELECTRIC COMPANY, Chicago, Ill., has secured

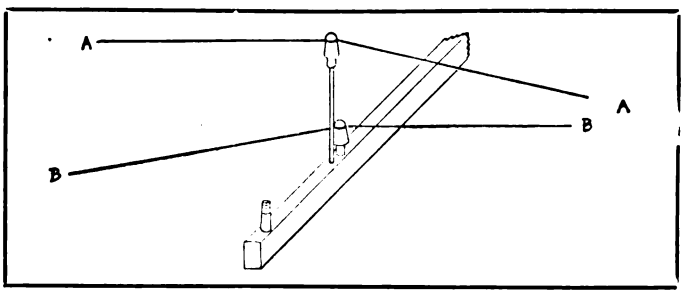

Fig. 1. Steel pin running transposition.

the contract for equipping the system of the Home Telephone Company at Spokane, Wash.

It calls for the building and installation of a 3,500 line automatic exchange of the most modern type, together with power appliances, telephones, etc.

San Diego, Los Angeles, San Francisco and Oakland, Cal., Portland, Ore., Walla Walla, Tacoma, Bellingham and Spokane, Wash., all having automatic installations, will be important factors in an extensive long distance system being worked out on the Coast by local capital.

THE STROMBERG-CARLSON TELEPHONE MFG. CO., Rochester, N. Y., reports having recently closed contracts for switchboards in the following places: Lansford, N. D.; Willow City, N. D.; Beaumont, Tex.; Page, N. D.; Colton, S. D.; Ossawatomie, Kan.; Carter, Wis.; Chicago, Ill.; Calais, Me.; Sutton West, Ont., Can.; Bedford, Ind.; Grimes, Ia.; Ames, Ia.; Larrabee, Ia.; Ludlow, Ill.; Dieterick, Ill.; Streator, Ill.; Hoople, N. D.; Ashland, Mo.

THE UNITED STATES COIN REGISTER COMPANY, Toledo, Ohio, has recently issued catalogue No. 1 describing its recording pay stations and other supplies. The book gives some very interesting information concerning the means which are available for making pay station collections. As the box sold by this company is said to be perfectly safe against all known plans for working without a coin and furnishes a record of all collections the result claimed to be secured by its use is an exact payment for the amount of business transacted. Various styles adapted to different locations are shown, as well as forms of records made by the boxes.

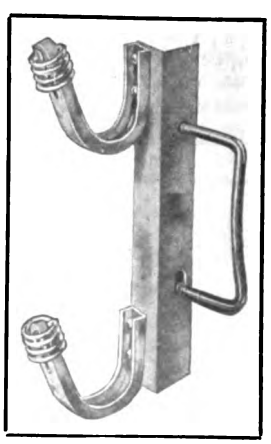

Fig. 4. The Peirce two-pin bracket for transpositions.

An attractive line of telephone booths is also illustrated, and dimensions and prices are given.

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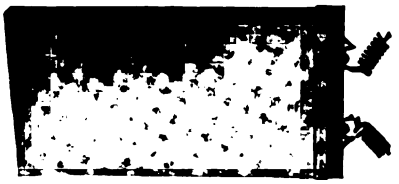
Some of the Products of our Factory

Write for Green Booklet that illustrates and describes our Newest Types of Telephones

Type C. 5 Bar 1600 Ohms



½ M. F Condenser

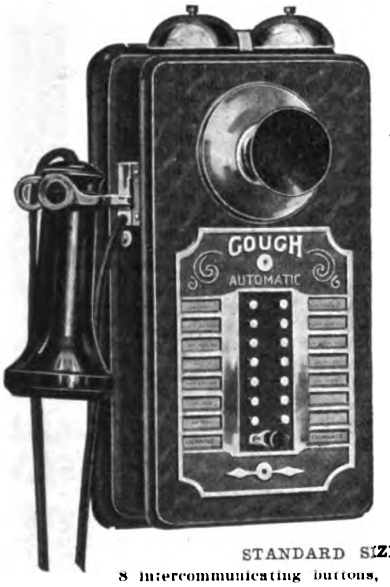
5 Bar 1600 Ohm Magneto

Type D. Desk Stand

WESTERN TELEPHONE MANUFACTURING COMPANY

58 W. JACKSON BOULEVARD Established 1893 CHICAGO

PUSH the TRUNK BUTTON



at the bottom of the plate and you are connected with the city exchange. Even if you have fifty telephones in your private system, you don't need a special operator.

Our Automatic Reset Intercommunicating Telephone with the trunk button does away with the branch exchange.

Made in a number of attractive styles. This is one of them. The desk set and the metal front flush wall set are two others.

Trunk Button

Send for Catalogues

STANDARD SIZES:

8	intercommunicating	buttons,	1	exchange	button
14	"	"	1	"	"
18	"	"	1	"	"
24	"	"	1	"	"
28	"	"	1	"	"

100% CHEAPER THAN BRANCH EXCHANGE.
100% QUICKER; 100% MORE SATISFACTORY.

S. H. COUCH CO., Inc., Manufacturers

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THE OVERTIME CHARGES ON TOLL MESSAGES

may be a small amount, but unless they are all collected, the company will lose a large sum in the course of a year.

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times every message and determines the correct overtime charge. Write for Booklet. It makes no Clerical Errors.

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NEW COMPANIES.

FORREST CITY, ARK.—The Forrest City and Cutoff Telephone Company has been organized at Forrest City with J. J. Barron as president; Dan Wylds, Sr., vice-president; B. D. Harper, secretary and treasurer. Construction work on the company's line, which will extend from Forrest City to Cutoff, a distance of seventeen miles, will be commenced at once.

RUSSELLVILLE, ARK.—The Atkins Telephone Company has been incorporated with a capital stock of $10,000. The Atkins exchange was formerly owned by the Russellville Telephone Company, and was sold by them to the new corporation. G. T. Brown has been elected president, and Jos. Brown, manager.

DISWOOD, ILL.—The Diswood Independent Telephone Company has been organized with the following officers: E. Mason, president; Henry Cline, secretary; W. J. McCrite, L. H. Vick and Luther Hassler, trustees. It is the intention of the company to buld a line from Diswood to Tamms, Sandusky and south to Cairo, connecting with the Cairo line at Tamms or Sandusky.

OAKLAND, ILL.—The farmers in the neighborhood of Jack Oak are arranging for the formation of a Farmers' Telephone Company, which will, if a franchise is granted, have its exchange at Oakland. If a franchise is not granted at Oakland, connections will be made with the exchange at Hindsboro.

GARNET, MICH.—The business men of Garnet and Rexton are organizing a new telephone company to operate in competition with the Michigan State Telephone Company (Bell), whose service has been far from satisfactory. The line mapped out by the proposed new company is as follows: From Newberry by way of Hendricks Quarry to Garnet, Rexton and to Lake Michigan shore through Epoufette to St. Ignace. And from Engadine to Naubinway, and from Naubinway to Garnet. Those interested in the formation of the company are James Nickel, D. N. McLeod, W. R. Hudson and B. F. Hudson.

GOOD THUNDER, MINN.—The business men of Good Thunder are organizing a new company to construct a telephone system at Good Thunder.

RICHFIELD, NEB.—The Sarpy Mutual Telephone Company, of Richfield, Sarpy County, has been incorporated with a capital stock of $25,000. The incorporators are Thomas Hamilton, L. C. Overton and Herman Lineman.

ROCKAWAY BEACH, L. I., N. Y.—It is reported that some of the citizens of Rockaway Beach, headed by Dr. G. K. W. Schenck, are planning to organize a co-operative telephone company to supply Rockaway Beach with service. Dr. Schenck expresses his willingness to subscribe $5,000 toward the cause.

MEDFORD, N. D.—Articles of incorporation have been filed by the Medford Mutual Telephone Company, of Medford, N. D. The capital stock is placed at $600, and the following are among the incorporators: Dan McKeeth, A. H. Kellogg, M. B. Kellogg, Wm. Falter, Fred Olson, John Pfaunsmith and A. E. Hunt, Medford.

GOODNIGHT, OKLA.—Articles of incorporation have been filed by the Goodnight Telephone Company, of Goodnight, Okla. The company is capitalized at $900 and the following are the incorporators: P. Morrison, J. C. McMillan and J. F. Ralston.

HYDRO, OKLA.—The Northwest Hydro Telephone Company, of Hydro, Okla., has been incorporated with a capital stock of $1,500. The directors of the company are William Gist, W. M. Hafer and Frank Pitzer.

HARTSTOWN, PA.—The Fallowfield Telegraph and Telephone Company has been incorporated with a capital stock of $12,000. The company will conduct a general telephone and telegraph business in Crawford County, and under its charter it is also privileged to operate police and fire alarm systems. The proposed route of the Fallowfield company's lines is from Hartstown to Adamstown, via McQuiston's Mill; from Hartstown to Atlantic, via Randolph's Corners, and from Hartstown to the lines of North Shenango and Sadsbury townships, with headquarters at Hartstown. George Stratton, of Linesville, has been named as treasurer.

MT. PLEASANT, PA.—Farmers of Mt. Pleasant and Unity townships are to make application for a charter for the Citizens' Telephone Company, of Kecksburg. The capital stock of the company is given at $2,000. It is the intention of the company to build lines between Greensburg, Mt. Pleasant and Latrobe.

WESLEY POST OFFICE, Pa.—The Venango Telephone Company, with general offices at Wesley Post Office, Venango County, has filed articles of incorporation. The company commences business with a capital stock of $5,000, and is to conduct a general telephone business with exchanges at several places in Venango, Mercer and Butler counties. Connections will be made at Grove City, Mercer County, with the Union Telephone Company. The treasurer of the company is Bert McKee, of Clintonville.

COLUMBIA, S. C.—Articles of incorporation have been filed by the Columbia Rural Telephone Company, which has a capital stock of $1,000. Among the incorporators are W. H. Lyles and E. L. Craig.

MACFARLAND, DANE CO., WIS.—The People's Telephone Company, of Macfarland, Dane Co., Wis., has been incorporated with a capital stock of $5,000. The incorporators are Charles F. Hunter, Hugh R. Henry and Lawrence Larson.

FRANCHISES.

ANAHEIM, CAL.—A telephone franchise has been sold to Arthur Wright, representing the Valley Home Telephone Company.

MACOMB, ILL.—A petition has been presented for an ordinance for the Farmers' & Merchants' Telephone Company. While an ordinance was granted some time ago the bond was never filed, and it is the desire of the company at this time to secure a new ordinance, and that the bond of $2,000, signed by T. F. Dudman, B. F. McLean and J. W. Bailey be approved.

HARRODSBURG, KY.—A telephone franchise for ten years has been secured by F. P. James, cashier of the Mercer National Bank, representing local capitalists, and $10,000 worth of stock taken up. Steps will be taken at once to construct a new up-to-date system to connect with the Home Telephone Company.

CENTRALIA, WASH.—The Centralia City Council has passed a franchise granting F. B. Hubbards the right to maintain and operate a telephone system in Centralia. It is the intention of Mr. Hubbards and his associates to install a first-class system within a year.

FINANCIAL.

MT. PULASKI, ILL.—At a recent meeting of the Mt. Pulaski Telephone Company it was decided to increase the capital stock from $5,000 to $50,000.

QUINCY, ILL.—The County Home Telephone Company, of Quincy, Ill., has increased its capital stock from $2,500 to $500,000.

MANITOWOC, WIS.—The Manitowoc and Western Telephone Company has increased its capital stock from $2,500 to $25,000.

COMBINATIONS.

BEATRICE, NEB.—Connections have been made between the New Home Telephone Company, of Beatrice, and the Blue Springs Telephone Company.

ELECTIONS.

HEYWORTH, ILL.—The Heyworth Telephone Company has elected the following directors: H. E. Fitchhorn, C. H. Rottger and Fred Beckman.

PERSONAL.

GEORGE K. BLAKELY, who has been manager for the Northwestern Telephone Exchange Company at Grand Forks, N. D., has been appointed district manager. His district comprises the northern half of North Dakota, with headquarters at Grand Forks.

C. D. CARTER, for a number of years manager of the Crookston office of the Northwestern Telephone Exchange Co., has been appointed district manager. His territory is in northern Minnesota and covers ten counties, with headquarters at Crookston.

ERWIN D. EMERSON, who has been manager at Burlington, Vt., for the New England Telephone & Telegraph Co., has been advanced to the management of the exchange at Portland, Me..

NEWS—WANTED

THE matter contained upon the Message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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No Shocked Patrons

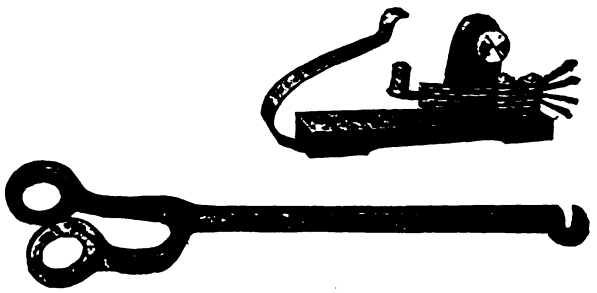
Few telephone manufacturers realize the importance of a perfectly designed switch-hook.

Because all circuit connections are permanently fastened and aside from the generator shunt the only movable contacts are in the switch-hook.

The ANDRAE is self contained and has perfect contacts.

IF YOU USE AN ANDRAE SHOCKLESS SWITCH-HOOK

They are guaranteed to be absolutely shockless



We have a very complete line of telephone supplies---have been in the business since 1860. Write for free illustrated catalog on the telephone question.

It is possible to remove the Andrae switch-hook without disturbing the contact springs or any adjustments.

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You never need to worry that your subscriber will receive a shock when connection is made.

JULIUS ANDRAE & SONS CO.

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A STRONG, SERVICEABLE HANGER MADE IN THREE WEIGHTS. GALVANIZED OR JAPANNED

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NORTON TOOL CO.
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WEST PARK OHIO

ALL COPPER
4 Styles

Cat. No. 708
List price 41 cts.
Discount 50%

YOU TALK

Through the switches on your lines.

The Trumbull U Switch CLIP

insures perfect contact and good transmission.

Write for particulars.

TRUMBULL ELECTRIC MFG. CO., 618 Woodford Av. Plainville, Conn.

Are You Building for the Present or the Future?

This is a vital question. Perhaps you haven't given as much thought to it as you should.

Poles on the average do not last more than eight years. The available supply is rapidly diminishing, hence when the time arrives for reconstruction the cost will be considerably more than it is at present.

The question then is, **"Can the life of poles be extended?"**

The answer is, **"Yes, by using Avenarius Carbolineum."**

This liquid preparation will double the life of poles to which it is applied and at the same time strengthens the fibre of the timber.

Write for book of proof and ask for prices. You will be surprised.

Cheap as Paint. Good as Gold

Carbolineum Wood Preserving Co.
126 Reed Street Milwaukee, Wis.

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THE WEEK'S MESSAGES

FRANK C. MASON, for twenty years superintendent of the police telegraph system in Brooklyn, N. Y., has retired from active service. When he was appointed superintendent, March 11, 1884, the telegraph equipment was crude and inefficient. Now, however, thanks to his progressive policy, all of the thirty-three precincts are provided with modern telegraph and telephone facilities. Mr. Mason organized the Long Island Telephone Co. from which, later, developed the New York & New Jersey Telephone Co.

D. B. SMALL has been appointed superintendent of the newly established Fitchburg District of the New England Telephone and Telegraph Company, with headquarters at Fitchburg, Mass. The new district includes forty-one cities and towns in Massachusetts and New Hampshire.

LLOYD WILSON, formerly manager for the Nebraska Telephone Company, at Central City, Neb., has been made manager of the exchange at Grand Island.

MISCELLANEOUS.

CALDWELL, IDAHO.—The Independent Long Distance Telephone Company, which is erecting a new exchange at Payette, expects to increase the size of its exchange at Caldwell. The enlarged quarters have been made necessary in order to enable the company to take care of its increased business.

RUSSELLVILLE, ARK.—The Russellville Telephone Company has sold its Atkins business to the Atkins Telephone Company, of which Triggs Brown is president.

Pierce, whose appointment as manager of the Home Telephone Company was announced on this page on August 4th, has never been connected with the Home Telephone Company, nor is any such connection contemplated.

VINCENNES, IND.—George H.

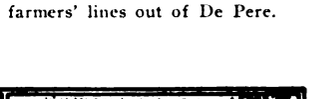
PALMYRA, MO.—C. A. McComb has sold his telephone system at Palmyra to Wm. Lind.

MISSOULA, MONT.—The Independent Telephone Company, of Butte, represented by H. A. Galway, of Butte, and Mr. Brown, of Salt Lake City, is interesting the citizens of Missoula in the construction of an Independent plant at that point. It is the intention of the company, which has connections with Anaconda, Great Falls and other points in the central part of the State, and which will shortly make connections with Billings and other Eastern Montana points, to install a branch of its system in the Missoula and Bitter Root valleys. It is also the intention of the company to apply for franchises at Stevensville and Hamilton.

ZANESVILLE, O.—A very successful picnic was recently given at Moxahala Park for the operators of the Independent Telephone Company. Girls from the exchanges at Roseville, Crooksville and New Lexington were present, and Manager J. B. Rhodes acted as host.

DE PERE, WIS.—The Valley telephone plant in Green Bay and De Pere is to be turned over by the contractors, Messrs. Jones and Winters, to the Valley Company. The plant, which has been built and operated by the contractors, was to be turned over to the Valley Company when the requisite number of subscribers had been secured. It is the intention of the company to build 75 to 100 miles of farmers' lines out of De Pere.

New Construction in the Field



ANAHEIM, CAL.—The Home Telephone Company, of Anaheim, is to spend about $40,000 in improvements. It expects to construct a new office building, and will install an up-to-date system. Work will be commenced at once.

CHAMPAIGN, ILL.—The Home Telephone Company has commenced the construction of a new line from Champaign to Tuscola.

WAUCONDA, ILL.—A farmers' line is being built by the Lake County Telephone Company west from Wauconda. As soon as this line is completed lines will be built in other directions.

WYANET, ILL.—It is the intention of the Farmers' Telephone Company to extend its lines in and around Wyanet.

BUCK CREEK, IND.—The Elkhart Telephone Company, of Buck Creek, is rebuilding its lines through Pyrmont.

COLUMBUS, IND.—The Citizens' Telephone Company is to make some improvements in its system.

RICHMOND, IND.—The Home Telephone Company expects to erect a modern telephone exchange building at Richmond, Ind.

ROME, IND.—The lines of the Home Telephone Company are being extended in Rome.

MANCHESTER, IOWA.—The Delaware County Telephone Company is to construct additional cable lines in Manchester, to take care of its increasing business.

SIOUX CITY, IA.—The Sioux City Telephone Company expects to double the capacity of its present plant. Among other extensions, the company will run a new trunk line to the west side. Another trunk line will be run to the north part of the city, and the capacity of the switchboard will be increased to take care of the new business.

WEBSTER CITY, IOWA.—New rural lines are being constructed by the Hamilton County Independent Company into the Woolstock territory.

LEAVENWORTH, KAS.—Among the contemplated improvements in the People's Home Telephone Company may be mentioned the erection of a new exchange at Leavenworth, which will be equipped with the most modern apparatus, the rebuilding of its system in that city, and the placing of its wires underground in the business districts.

FOXCROFT, ME.—The Farmers' Telephone Company, which has lately installed a new switchboard to take care of its increased business, will build a line from Foxcroft toward Sebec.

HOULTON, ME.—The Independent Telephone Company, which has been in operation in Houlton for about a year, is building a number of new lines, and eventually its service will extend over the entire Aroostook County.

SUMMIT CITY, MICH.—The lines of the Farmers' Mutual Telephone Company are being extended in Summit City.

TRAVERSE CITY, MICH.—The Independent Telephone Company is building new lines from Traverse City to Kingsley.

VASSAR, MICH.—The Valley Telephone Company is building a line north of Vassar, running past Carr's Corners.

DULUTH, MINN.—The Zenith Telephone Company expects to build additional lines in Duluth.

HASTINGS, MINN.—The Twin City Telephone Company is stringing additional wires in this place.

MESABA, MINN.—The entire outside construction work of the Mesaba Telephone Company at Grand Rapids is to be rebuilt. Twenty-two thousand feet of cable and twenty-five thousand feet of insulated wire will be used in this work. New lines are to be built, a new switchboard installed, and connections made with Deer River, Bovey and Coleraine. When the work is completed the Mesaba Telephone Company will be in a position to give Grand Rapids the same unequaled service that is enjoyed by Hibbing, Virginia, Evelth and other iron range towns.

ABBEVILLE, MISS.—Connections between the exchanges at Coldwater and Abbeville have been completed by the Rural Telephone Company. The lines extend through three counties, Lafayette, Marshall and Tate, for a distance of over sixty miles, and give connection to the inland towns of Blackwater, Harmontown, Teckville, Tyro, Looxahoma and Independence.

CANTON, MO.—The Citizens' Telephone Company, of North Missouri, is rebuilding its exchanges at Canton, La Grange and Monticello.

CANTON, MO.—The Northeast Missouri Telephone Company (formerly the Lewis Telephone Company), is constructing commercial lines connecting all the exchanges of their system, including Canton, La Grange, Maywood, Durham, Ewing, Lewistown, Monticello and Williamstown.

PALMYRA, MO.—C. W. Brunson, of Palmyra, is building a line to La Grange, a distance of about 25 miles.

SCOTTS BLUFF, NEB.—The Platte Haley Telephone Company, of Scotts Bluff, is to build telephone lines in connection with the North Platte irrigation project in Nebraska and Wyoming. Connections will be made between the headquarters of the Interstate canal at Whalen, Wyo., and the various camps and stations of the reclamation service. Eleven stations will be installed at the various camps between Guernsey, Wyo., and Bridgeport, Neb. Long distance service will also be furnished to the Pathfinder dam site, located above Alcova, Wyo.

WEST DERRY, N. H.—The West Derry Telephone Company contemplates the enlargement of its exchange at West Derry to take care of its increased business.

LEBANON, N. J.—The Lebanon Telephone Company is planning to extend its lines to Woodglen and Glen Gardner.

EAST AURORA, N. Y.—The East Aurora Telephone Company has installed a new switchboard.

RAVENA, N. Y.—The Home Telephone Company, of Albany, N. Y., is constructing lines at Ravena.

LOGAN, O.—It is the intention of the Logan Home Telephone Company to build a new toll line between Logan and Straitsville.

CLEBURNE, TEXAS.—The Cleburne Telephone Company is to install a complete fire alarm service at Cleburne.

PILOT MOUND, CANADA.—The council has voted money toward the extension of the Louise Telephone Company's lines into Pilot Mound to compete with the Bell Company. J. D. Campbell, secretary-treasurer, Pilot Mound, can give particulars.

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The American Telephone Journal

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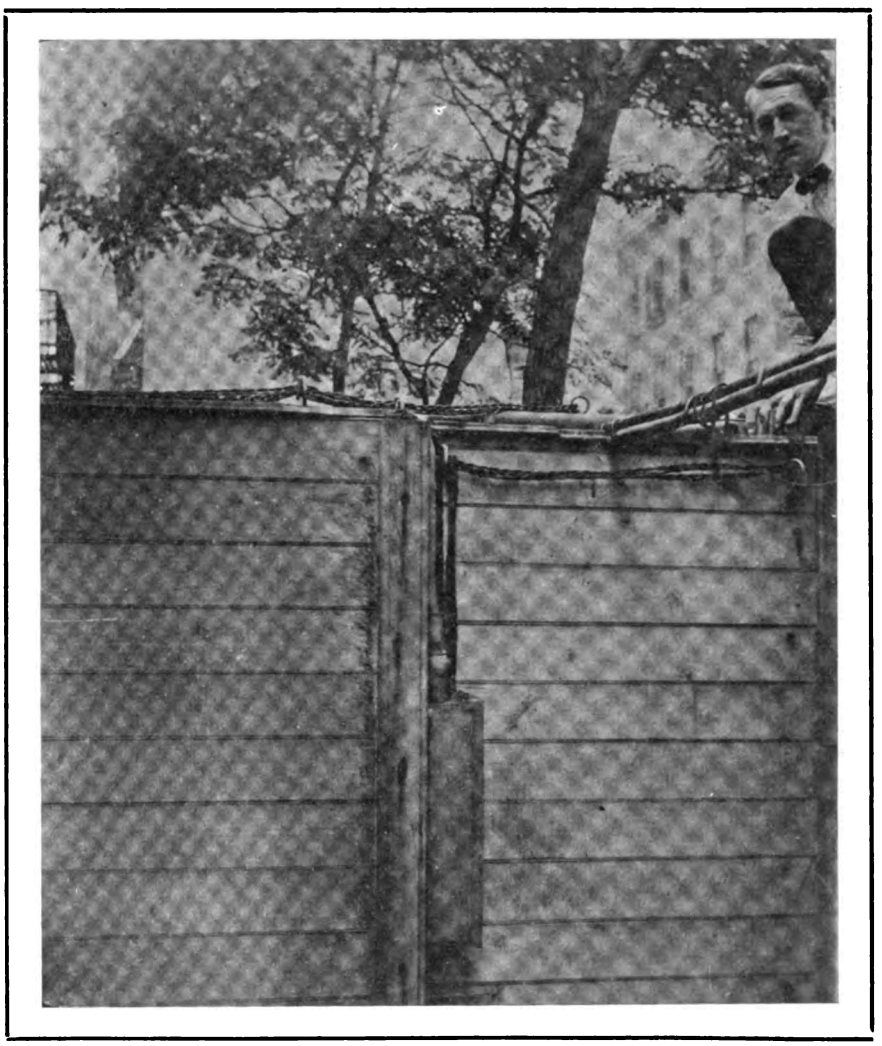
VOLUME XIV *SATURDAY, AUGUST 25, 1906* *NUMBER 8*

Some Features of Interior Block Distribution on Manhattan Island

By O. R. Barnes.

WHILE the use of the box described in the preceding section of this article is the characteristic feature of the system to-day, the Bell company has not used it from the beginning. Up to about six years ago there was used a wooden box, the design and construction of which necessitated the use of from six to ten feet of rubber or wool insulated encased cable requiring a necessary splice in the form of a pothead and the making of an unsightly bend at the box. The telephone company found after a few years with the wooden boxes in service that their endeavors to secure economy in this manner were leading them to disaster. When we consider that it requires in the neighborhood of 25,000 boxes to cover Manhattan it is not hard to conceive why iron boxes are more desirable. Wooden boxes began to fall to pieces from decay and the constant careless use given them by troublemen and inspectors—hence the iron junction box.



Junction Box Mounted on Fence, with Paired Wires Distributed in Rings to Neighboring Houses.

Since the iron junction box has been in service there have been noted decided reductions in construction, maintenance, and depreciation costs. Where it used to cost $8 and $10 to run a single pair of wires to a new subscriber from the roof fixture it can now be done for less than $2. This reduction is due to shorter wire runs and the cheaper wages now paid to wiremen. The wages now range from $7 to $15, or average about $10 per week. Skilled linemen are not required with the junction box method, for the wires are, in the main, kept on tops of fences where they can be reached from the ground. Maintenance is 50 per cent. less than what it was with the roof fixture. The depreciation of the outside plant has been reduced considerably.

As has been stated all blocks are practically identical in formation, so what is said about one block must be equally true regarding them all. Therefore, a meagre description of the manner in which the junction box method is installed will suffice to convey an idea of what it involves.

Engineers are provided with elaborate blue-prints of the block about to be taken up for reconstruction, showing in detail the formation of the properties. The telephones are plotted in on these blueprints, and a theoretical run is drawn in for the conduit, cable and juncton box locations. Having the telephones plotted in enables the engineer to decide upon the sizes of the boxes, and the most advisable locations for the best wire runs. A theoretical run simply means that a proposed duct is drawn in on the print from the nearest manhole to the basement of a convenient property, and the extension of a cable (usually 51 pairs) through the basement of that property out into the rear yard, where it is then carried up on the rear fence and along on top of the capping to the various junction boxes, diminishing in size as it is distributed to these boxes. In long blocks several such entrances are usually made, one at each end and one in the centre. The junction boxes which are

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of several sizes, 11, 16, 21 and 26 pairs capacity, are mounted on the fences four and five feet above ground level, and are spaced about four properties apart on alternate sides of the fences so that one box serves eight properties on the north side while the next serves eight on the south side. Taking the blue-prints with him out on the ground the engineer is guided by the theoretical scheme which they outline, and aims to lay the work out as systematically as consistency will permit. If he finds the fences in good enough physical condition to sustain the weight of cable and boxes he utilizes them, if not he lays the cable run out on the rear walls of the buildings. After satisfying himself that he has picked out the best duct entry and has laid out a good run for the cable he writes a complete set of specifications concisely embodying every detail of the work. He then takes up the next block.

The specifications are checked in the office, after which a number of typewritten copies are made and forwarded in routine manner to the various construction forces that have to do the work for their guidance.

Unless some flaw is found in the specifications the work progresses smoothly by all concerned. Each department takes the work up uniformly where the other department leaves off until it is completed.

The scheme of writing specifications on all work, while ideal from an economic point of view, requires that the engineer be something more than an electrician and a mathematician. He must instinctively be a student of human nature, so as to lay work out not only to meet with the approval of the departments that have the doing of it, but also so that it will not be considered by property owners as a defacement to their property. It is necessary for him to possess an exceptional amount of good judgment combined with a fair knowledge of conduit and cable engineering. He must be thoroughly hardened to the knocks of the telephone business in order that he may not become discouraged over trivialities. It is by means of specifications that the engineer increases the working efficiency of the construction forces, and eliminates the chance for disputes between heads of departments. Specifications leave no room for doubt as to how a certain piece of work is to be performed. Before specifications were adopted the wheels of friction were always working overtime—the head of one department never believed in doing his work in accordance with the way it was desired by the other departments, and as a result his men were not properly impressed with their responsibility to follow instructions and work was seldom done correctly.

(To be continued.)

Increasing the Range of Transmission*

By J. L. Goodwin.

THE fact that the receiver efficiency could be improved by about one hundred per cent. was stated at the conclusion of the last preceding section of this article. This statement was made after a discussion of certain phenomena having reference to the circuit shown at the left of Fig. 6, but will perhaps be better understood if explained in connection with the circuit shown in the right hand portion of that figure, and the circuit shown in Fig. 7.

Referring now to Fig. 6, there is shown the alternator 10 as the equivalent of the secondary source of electromotive force 10 in Fig. 7, and 10' is another generator at the distant end of the circuit similarly arranged, the rest of Fig. 6 being identical with Fig. 7 and with similar indices. Alternator 10 is supposed to be generating an electromotive force, which is considered at the moment when the current is in a positive diection following the arrows. The transformers Tr_1 and Tr_2 are taken as identical with a transformation ratio of one to one with one hundred per cent. efficiency, primary and secondary turns wound together on the same core and connected as shown in the diagram.

Consider now the current flowing in the direction of the arrows. Upon reaching the terminal 12 of the transformer Tr_1, it passes through the line-coil or primary in a direction around the core, as shown, creating a magnetic flux through the core and an induced electromotive force in the other or secondary winding which flows in the opposite direction around the core of the transformer and into the line at 14. A similar action takes place in transformer Tr_2, which generates an electromotive force in its secondary in the same direction as that in the secondary of Tr_1, which on account of the two secondaries being connected places these two secondary electromotive forces in series. Now it is evident that the current from generator 10 upon reaching 14 has two paths, the one through the main circuit and the generator 10' and the other through the two secondaries 15 and 16. It is also obvious that the secondary path through windings 15 and 16 is impassable, because this path contains an electromotive force of its own, due to mutual induction, opposed to the direction of the current. In fact, this second path has an electromagnetic force twice as great as the eletromagnetic force in coil 13 and itself produces a current which is placed in multiple with the current in the line primary. In addition to this it is evident that secondary coils 15 and 16 being in series and of a potential twice as great as that in the main, a current is also forced back through the primary coil 13 and the generator 10 and the potential of the generator reduced in the main line by half of its former value.

Reversing the diagram and considering 10' as the generator and 10 as the other terminal, the status of the system is also reversed and the potential through the circuit between 11 and 12 and through generator 10 will be twice that given by generator 10'. These results are of course predicated upon ideal relations and efficiencies and in actual practice would be modified by the losses in the transformers and the relative values of transformer and generator constants. Thus it is seen that by the use of compensating transformers it is possible to

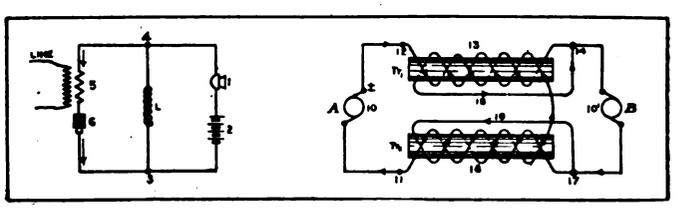

Fig. 6. The right hand diagram illustrates the principle and method of using compensating transformers in the main line for the purpose of reducing secondary effective impedance and increasing the effective line potential.

raise or lower the line voltage or by properly adjusting the transformers or their constants of transformation one may maintain the original potential of the source, while reducing its internal impedance to incoming currents as a result of the shunt to incoming currents through coils 15 and 16. It should be observed, however, that incoming currents are not only shunted in multiple with the source 10, but are raised in potential to twice that of generator 10', thus reducing the impedance of the terminal from two causes, and thereby increasing the current through the circuit. It will be noted that there have been shown and described two compensating transformers in relation to the source of electromotive force—one on each side thereof. Now this is not essential, and in practice one transformer properly adjusted as to constants and transformation ratio so as to equal the line electromotive force will answer, as shown at B in Figs. 7 and 8.

A diagrammatic representation of a local battery type of the system in conventional symbols, which will be readily understood, is given in Fig. 7. From this figure, where similar references indicate

*Continued from the issue of August 18th.

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similar parts at each terminal of the line, it will be seen that the principles disclosed and explained with reference to circuits of Fig. 6 are applied to the operation of Fig. 7. Referring now to Fig. 7

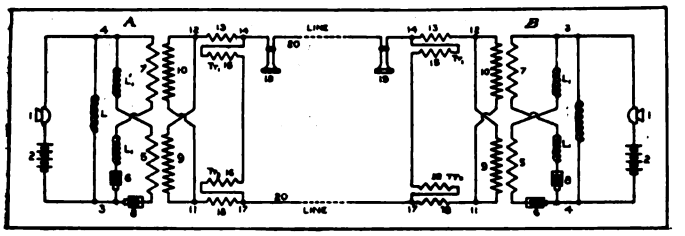

Fig. 7. Conventional diagram of Mr. Therrell's system as applied to local battery telephones.

specifically, A and B are the two distant terminals of the line. 1 is a telephonic transmitter of any approved type; 2 is a source of constant potential in circuit with transmitter 1, derived from which, branching from points 3 and 4, are two branch circuits containing inductances L_1 and L'_1, primary coils 5 and 7, and capacities 6 and 8. This is identical with Fig. 6 already explained, whereby primary coils 5 and 7 are made resonant for the desired frequencies, as disclosed and illustrated in the foregoing. Now primary coils 5 and 7 act by induction upon secondaries 9 and 10, setting up therein electromotive forces which act upon the compensator-transformers Tr_1 and Tr_2 in the manner previously described in reference to Fig. 6, which is identical with the secondary terminal system of Fig. 7. Therefore this arrangement gives a system whereby the transformer efficiency is increased by resonance one hundred per cent. or more, while at the same time the effective impedance of the equivalent secondaries is neutralized, thereby increasing the sensitiveness of the receiver 19, by one hundred per cent., making a net gain over old methods of at least two hundred per cent., as verified by actual experiments.

Fig. 8 shows two simple diagrammatic representations of central energy or common battery types of the system with distant terminals A and B and corresponding central offices C O, which will be readily followed from what has already been disclosed and a knowledge of common battery systems in general. Like indices refer to like or equivalent parts in Fig. 7. The right hand figure 7 is a modification of the one at the left, showing the method of applying the principles above described to subscribers' stations in a common battery system instead of at the central office, as under some circumstances may be desirable.

With reference to the practical application of this most interesting system it should be noted that it in no way conflicts with the plan for loading lines proposed by Dr. Pupin. It rather supplements it, or in proper cases may be used as a substitute for this comparatively very expensive method. The articulation over circuits which have been arranged by Mr. Therrell is wonderfully clear. The quality of the tones received are most agreeably like the original voice producing them, and have a pleasant musical ring due to the selective reinforcement of the overtones by the condensers.

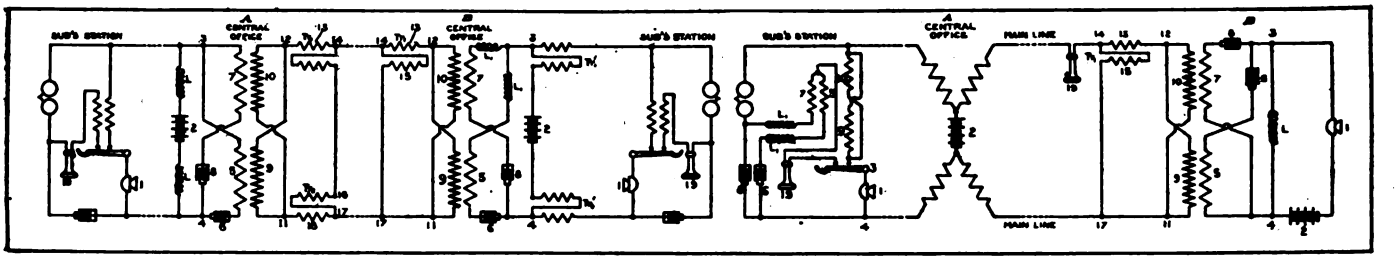

Fig. 8. Conventional diagrams of Mr. Therrell's system as applied to common battery telephone lines.

Test Stations

By Thomas Stanley.

ON long toll lines it is necessary to provide test points for two purposes. First, that the portions of the lines under test may be separated from the remainder, in order that the trouble may be more easily located. Second, that defective portions may be cut out of service, and wires in good condition substituted during the making of repairs. This process is technically called "patching." When the object is merely to provide means of opening the line for a test, all that is necessary is to connect the wires on the crossarm through some form of connection which can readily be opened by the lineman; and which, when in normal condition, will insure a tight joint with negligible resistance. Where patching is to be done, however, it becomes necessary to provide somewhat more elaborate apparatus. The proper installation of this apparatus requires a building of some sort, which usually must also furnish living accommodations for the lineman. The former are called Test points. The latter, Test stations.

Additional test points are incidentally provided at places where the character of the line changes from open wire to cable, and the reverse; as, for example, at the banks of streams, and at the extremities of underground or aerial cable sections. The cables in question being terminated in cable-boxes, means are afforded for both opening the wires for test and for patching by means of changing the cross-connecting wires.

Notwithstanding the facilities afforded by these two classes of test points, the presence of test stations is required in order to give the wire chief means to call the lineman whenever he desires; and to make with him whatever tests he deems necessary for determining the condition of the wires, or to report to him the presence of trouble. They also afford a means of stationing men at the necessary points along the line for the clearing of trouble in the shortest practicable time. The proper installation of test stations requires construction features which are characteristic, and which must be adhered to in order that the results required may be attained without detracting from the quality of transmission.

No very elaborate calculations have ever been gone into with a view of determining with mathematical accuracy the proper spacing of test points and test stations. There are a few factors, however, which are known to have a bearing on this point, and which may be enumerated as follows: The greater the volume of business handled over a given line, the greater is its earning capacity; and consequently the greater is the loss to the company during the time that the line is "in trouble." Therefore, in order that the line may be more carefully patrolled, and in order that trouble may be more promptly cleared, the spacing of test points and test stations becomes an inverse function of the volume of business. The time taken by a lineman to clear trouble depends upon the rapidity with which he can travel along the route of the line; therefore, the spacing of test points and test stations would depend upon the nature of the country through which the line passed, the character of the roads and their proximity to the line. The distance between stations would be greater where the country is level and traveling good than where the country is broken and the traveling bad.

A long toll line, such, for example, as the New York-Chicago

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line, is made up of a variety of classes of construction. In the open country it is composed of open wires, at river crossings and the like it runs through submarine cables, while its route through large cities takes it through more or less lead covered cable of the ordinary type. In each one of the large cities on the route the line may be assumed to pass through an exchange and be made up of switchboard cable, to say nothing of pot-head cable and cross-connecting wire. To illustrate this point rather more

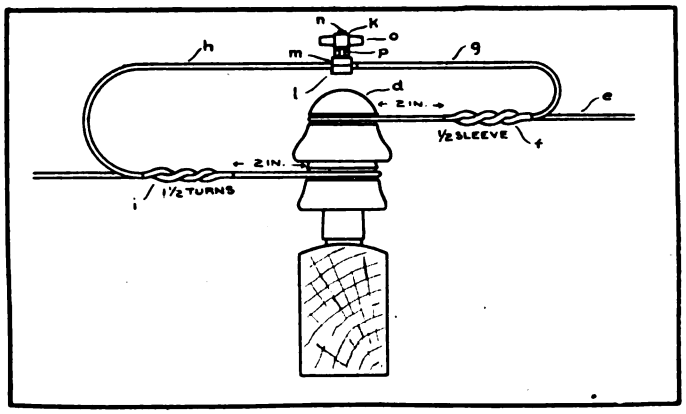

Fig. 1. Method of terminating lines on double pin insulator and carrying through by means of connector at test point.

fully by means of concrete figures, the line mentioned above would be made up of 30 miles of underground cable, 15 miles of submarine cable and about 10 miles of switchboard cable. Now the limit over which conversation can be carried on through cable is such that, exclusive of whatever is necessary at the test stations, this line already has very near the greatest amount which is allowable. In cutting in for test stations, therefore, the greatest care must be taken to reduce the length of bridle and switchboard cable required to a minimum.

Many local Bell companies, particularly those possessing a large toll area, as, for example, the Philadelphia Bell and the New York and New Jersey, find it necessary to cut their longer toll lines through intermediate offices. In these cases, however, the transmission requirements do not usually demand a special form of construction. Or if the transmission requirements should demand it, the fact is usually overlooked; and this class of lines is usually handled in the same manner as the subscriber lines and local trunks. With the object of teaching by means of a "horrible example" certain methods of doing this work will be mentioned to make clear the errors which are most likely to occur. It will later be shown how these defects are overcome in the handling of long distance toll lines, and the details of what seems to be agreed upon as a higher grade of construction will be explained.

To provide a test point on open wire lines the wires are dead ended on the test pole as shown in Fig. 1, which shows the end view of a crossarm carrying the terminal pin and insulator. The transposition insulator is shown at *d*. The wire *e*, coming from the east, is passed around the top glass of the insulator and secured by a half sleeve *f*. The free end of the wire *g* is bent up and back terminating over the top of the glass. The wire from the west, *j*, is passed around the lower groove of the insulator and secured by the half sleeve *i*, the free end *h* being bent up and back, also terminating over the "glass." The two ends are then passed into the connector *k*, and securely held by means of the screw. Before this connection is made, and subsequently, before closing the connection after it has been opened for a test, the ends of the two wires should be scraped bright to remove whatever oxide there may be upon the surface of the copper. The free ends of the wire should be cut long enough to enable the lineman to readily connect to them with his test set, when opened, without causing undue strains at the ends of the sleeves. Wanting this precaution it will be difficult to get a proper connection, and the wire will be apt to break off at the sleeve after the line has been opened and closed a few times. The connector should be so constructed as to be readily tightened and loosened, and when tight should grasp the wire firmly throughout its whole length. There are many forms of connector, of which the one shown in Fig. 1 has given good satisfaction. It consists of a lower and upper jaw *l* and *m*. Attached to the former, and passing through a hole in the latter, midway between the grooves for the two wires, is a threaded shank *n*, over which fits the thumb screw *o p*. This shank is threaded at the top to prevent the screw from falling off. When the screw is tightened, its lower part presses evenly on the upper surface of the jaw *m* so as to make it exert an even pressure on the wire beneath. The wire grooves are of such size that when the screw is driven "home" the upper jaw will just feel the lower one. This connector, as is the case with all connectors of this class, is made in different sizes to accommodate the different sizes of wire used in line construction.

The other class of test points referred to are those in which the character of the line changes from open wire to cable and the reverse. While this class differs from the former, in that they are not installed in order to afford means of testing, but simply because the change in the character of the line requires them, nevertheless since testing is done at these points the proper understanding of the subject requires that this class of constructors be explained. Underground and aerial cables are terminated in a cable box, placed usually on the terminal pole of the open wire line; or upon a special pole provided for the purpose. Submarine cables, however, require a rather more elaborate terminal as a general thing. Where the streams crossed are narrow, and the

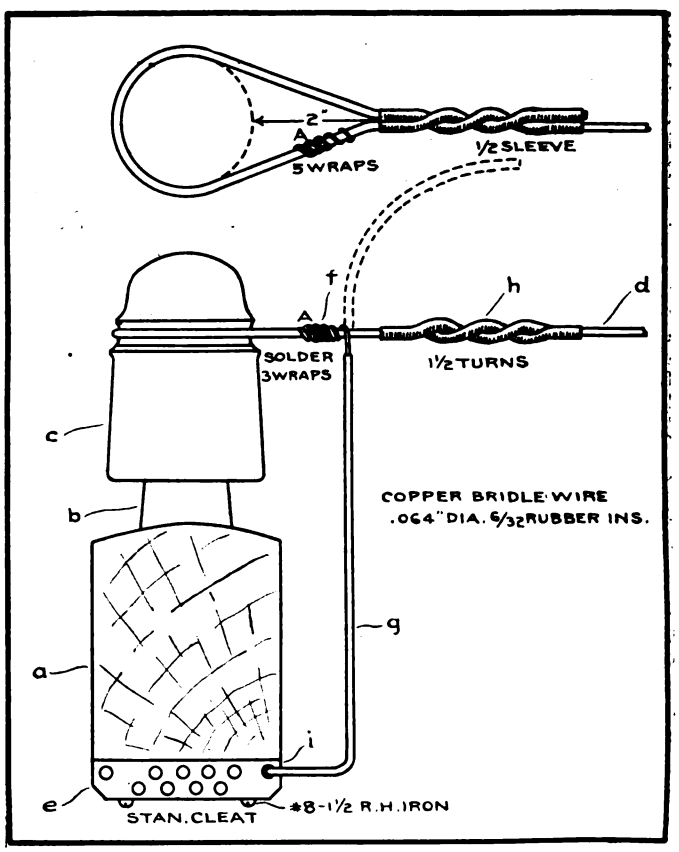

Fig. 2. Method of dead ending open wires at terminal pole from which they are led into test station.

location of the crossing is in country districts where little or no traffic exists upon the banks, the ordinary form of cable box will do as a terminal. Where the streams are wide and the current more or less strong, and the location of the crossing at or near towns or cities where the banks are likely to be occupied by traffic, specially designed cable houses must be made use of. These cable houses afford a greater protection against the entrance of people who are not connected with the company and prevent them from obtaining access to the terminal. They also afford a means of properly anchoring the cable, and give the galvanometer men and trouble hunters the necessary room inside to set up the

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instruments required to make whatever cable tests may be necessary from time to time.

Wherever the line changes from open wire to cable the fundamental rule that governs the character of the construction is to provide protection to the cable against the entrance of abnormally high currents such as would be caused by the crossing of the line with a trolley wire, and also the charging of the cable conductors to an abnormally high voltage such as would be caused by a discharge of lightning. It must always be borne in mind, however, when dealing with long distance toll lines that this protection must be so designed as not to increase the resistance to the point where the quality of transmission is impaired. For this reason heat coils or any other similar high resistance device cannot be used; and the protecting apparatus must be restricted to a fuse to guard against the abnormal current, and some form of carbon plate arrester to guard against abnormal voltage.

Fig. 2 shows the method employed for dead ending the open wires at the terminal pole. Incidentally the poles should be extra heavy and should be head guyed and double side guyed. The cross arms (assuming that 10 pin arms are used) should be of the regular terminal type having the pins spaced 9 inches apart. There are many cases, however, where the regular line-cross arms are used, and while this practice is not theoretically correct it answers the purpose well enough. Terminal pins, however, should always be used and should be so placed in the pin holes that the grain lies in the direction of the line. The insulators should be of the regulation pony type of the proper size to fit terminal pin. Referring to Fig. 2, the cross arm is shown in section at *a*, the pin at *b*, and the insulator at *c*. The line wire *d* is passed once around the groove in the insulator and fastened with a half sleeve *h*. The bridle wire, which is a number 16 B. W. G. wire braided and rubber covered, is shown at *g*. The insulation is removed for a sufficient distance from the end to allow the wire to be wrapped five times around the line, as shown at *f*. In making this joint the wire should be scraped clean to present a bright surface, wrapped tightly around the line wire and soldered. In soldering both the line wire and bridle wire should be heated sufficiently to enable them to melt the solder when brought in contact. It will then run down between the separate turns so as to form a proper connection. No acids or fluxes of any kind should be used, although prepared solder with a rosin core is permissible. At *e* is shown a cross arm cleat which is made of maple of the same length as the width of the arm and of a thickness of ½ in. There are 10 holes drilled through the cleat from side to side as shown in the figure. The bridle wire *g* is shown entering one of these holes at *i*. The cleat is fastened to the arm by means of two No. 8 1½ in. round head iron screws. These cleats are used for the purpose of preventing the bridle wire from touching the cross arm, which is absolutely necessary wherever creosoted arms are used, as creosote has a very deleterious effect on the braid and the rubber insulation. Incidentally they afford a means of making a neater appearance in the work. One of these cleats should be placed directly under each pin.

(To be continued.)

NEW YORK TELEPHONE MEN PREPARING TO MAKE NIAGARA FALLS CONVENTION A BIG SUCCESS.

THAT Independent telephone men in New York will gather in sufficient numbers at the Niagara Falls convention to indicate the full strength of the movement which is making such progress in the State seems assured.

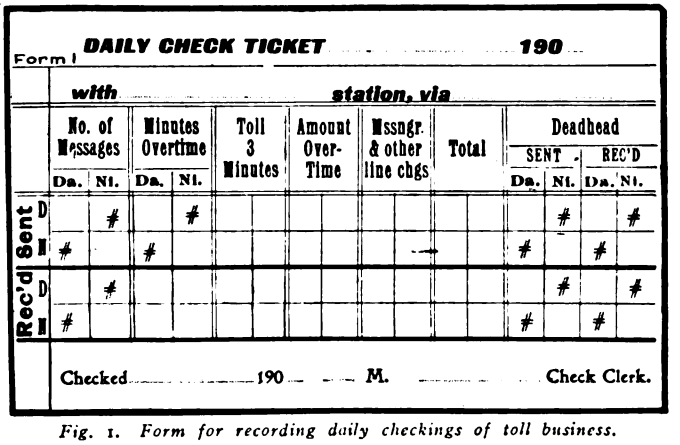
It is desired that every Independent company shall be represented by its officials and manager, and telephone men from all parts of the State will have an opportunity to meet and learn what is being done by their associates. A first class program has been prepared, and the delegates are going to have a good time and take measures which will be generally beneficial to the development of their business.

The excursion rates which will be in force from stations west of Syracuse on Labor Day, September 3, the day of the convention, and from Saturday until Monday night from all stations east of Syracuse, making it possible to attend this convention at exceptionally small expense.

Toll Accounting*

By J. S. Daily.

IN the few years of existence of the Independent telephone companies their activities have perhaps been used more in the scramble for place and hustle of constructive energy than in making conservative estimates of the project as a permanent dividend paying institution. While the old octopus was unscrupulously high in its charges some of the many infant prodigies, in their desire to meet the popular demand, have unwisely got below the limit of remunerative existence. This belief in so-called popular demand has brought out the idea of free exchange everywhere, and has appealed so strongly to our farmers that they have volunteered among themselves to construct a system of so-called farmer lines. The result is an indescribable conglomeration of wires and switching arrangements, connecting one community of farmers with another over party lines containing anywhere from twenty-five to one hundred stations, where any business transacted or any information transmitted becomes public property and oft-times scandal through the medium of the eaves-dropper.

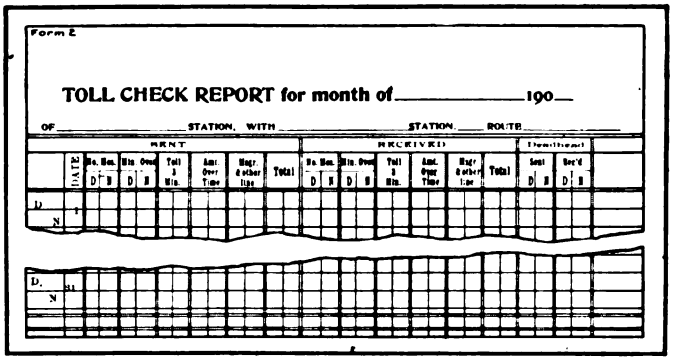

Form I DAILY CHECK TICKET ..... 190 ...

with ..... station, via .....

	No. of Messages Da.	Ni.	Minutes Overtime Da.	Ni.	Toll 3 Minutes	Amount Over-Time	Mssngr. & other line chgs	Total	Deadhead SENT Da.	Ni.	REC'D Da.	Ni.
Rec'd Sent D		#		#						#		#
N	#		#						#		#	
D		#								#		#
N	#								#		#	

Checked ..... 190 .... M. ..... Check Clerk.

Fig. 1. Form for recording daily checkings of toll business.


Form E

TOLL CHECK REPORT for month of ..... 190 ....

OF ..... STATION, WITH ..... STATION ..... ROUTE .....

SENT | RECEIVED

DATE	No. Mss. D	N	Min. Over D	N	Toll 3 Min.	Amt. Over Time	Mssgr. & other line	Total	No. Mss. D	N	Min. Over D	N	Toll 3 Min.	Amt. Over Time	Mssgr. & other line	Total	Deadhead Sent D	N	Rec'd D	N
D.																				
N.																				
D.																				
N.																				

Fig. 2. Monthly check reported used by People's Telephone Company for keeping track of toll business.

This animated contest for cheap connections has entirely overshadowed the toll proposition, and it is only now, when these first installations are beginning to decay and require additional capital to replace them that their operators are waking up to the fact that they are too cheap, and are looking around to see where

*Abstract from a paper read at a meeting of the Central Illinois Independent Telephone Association at Peoria, Ill.

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their misgivings are. They have already found that party line service connecting different exchanges has proven unsatsfactory. To overcome this fault non-interfering toll lines have been constructed, and in order to keep them in repair and operation a reasonable charge must be made. These toll lines are built individually, jointly, and collectively by the exchanges connected and a proper accounting of each owner's proportion for the amount of line used is now imminent. This requires checking each day's busness with each direct connecting exchange. Daily check tickets should be made and those accumulated on a monthly sheet showing the business transacted between stations each month, from which a proper adjustment of proportions due each company may be made. There should be a uniform method of checking and recording adopted throughout the Independent field.

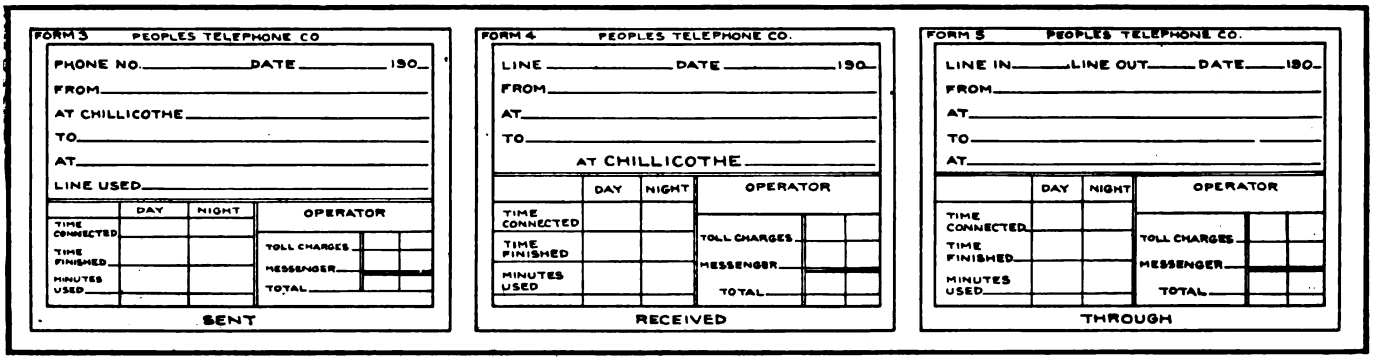

Fig. 3. Forms for toll tickets. Classification of accounts is facilitated by making tickets of different colors.

Three forms of toll tickets may be used, each on a different colored paper and slightly different in form, viz.: Fig. 3 shows a white ticket for messages sent; a light blue or green ticket for messages received; and a light yellow ticket for through business. These tickets should be recorded for future reference in a proper register book, a page similar to that shown in Fig. 4 is suggested as appropriate. After being recorded the white, or sent, tickets should be filed in a card index drawer having numbered guide cards to correspond with the subscriber's telephone number. At the end of the month the file should be sent to the bookkeeper for entry as a charge against the customer or cash toll account as the case may be, and when paid delivered to the customer. A footing of the total tolls charged in the ledger should correspond with the total footings of sent tolls in the toll record book together with those in the group of monthly toll sheets. This reduces the possibility of error to a minimum. A form of subscribers' ledger is suggested that is self-balancing. In this ledger (Fig. 5) each page balances in itself, thus warranting accuracy of all entries made.

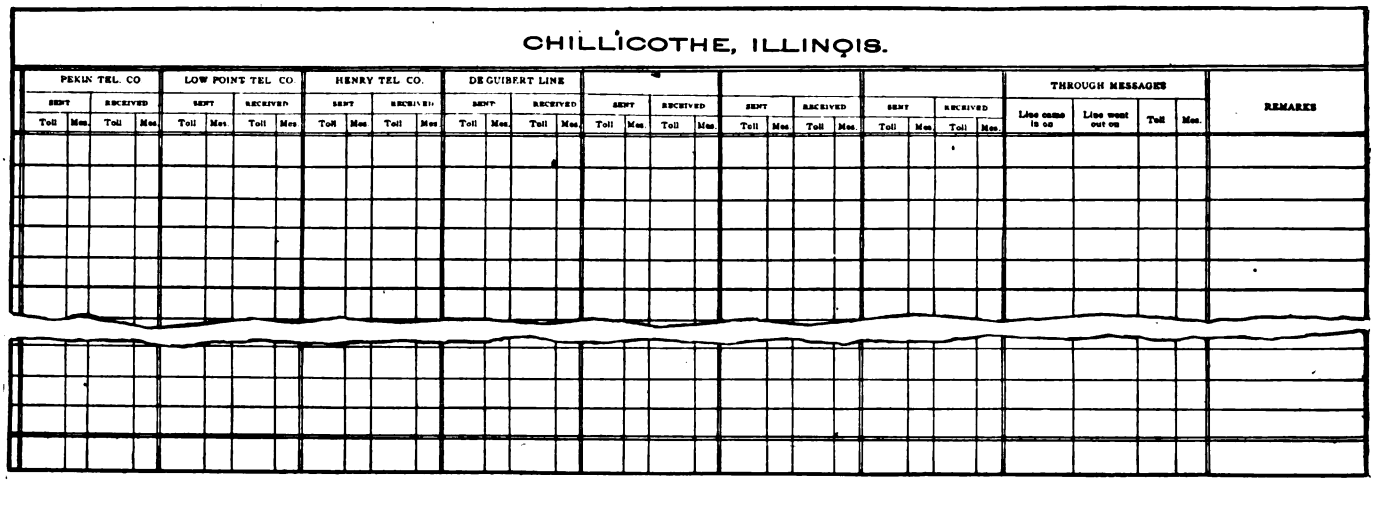

Fig. 4. Form used for recording interchanged business by the People's Telephone Company.

It is agreed that uniformity of stationary forms and accounting methods to be pursued is, together with a good map system, the most essential solution of the toll question to-day. Where no toll checking center or clearing house has been established, but each station settles with its neighbor, a good form of check ticket is the form shown in Fig. 1. These are made out by each office before checking the day's business and are made to correspond. When they are O. K'd. by the operators checking at the end of

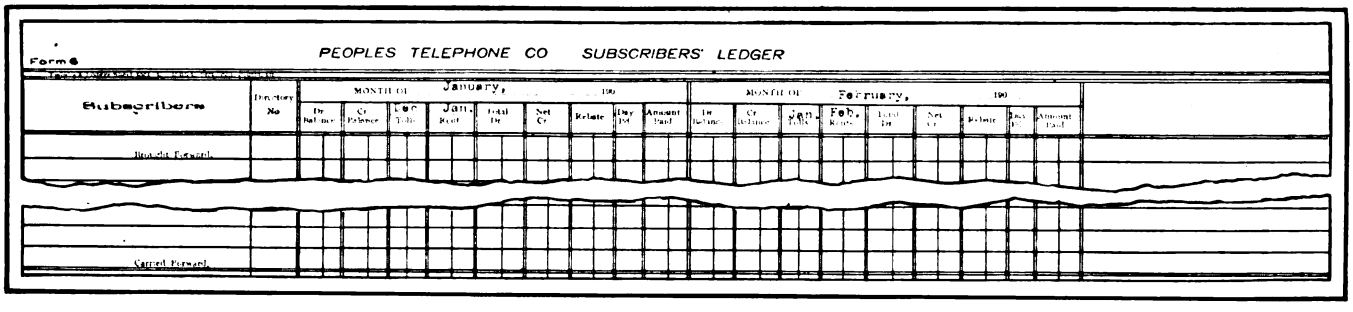

Fig. 5. Page of subscribers' ledger used by People's Telephone Company, of Chillicothe, Ill.

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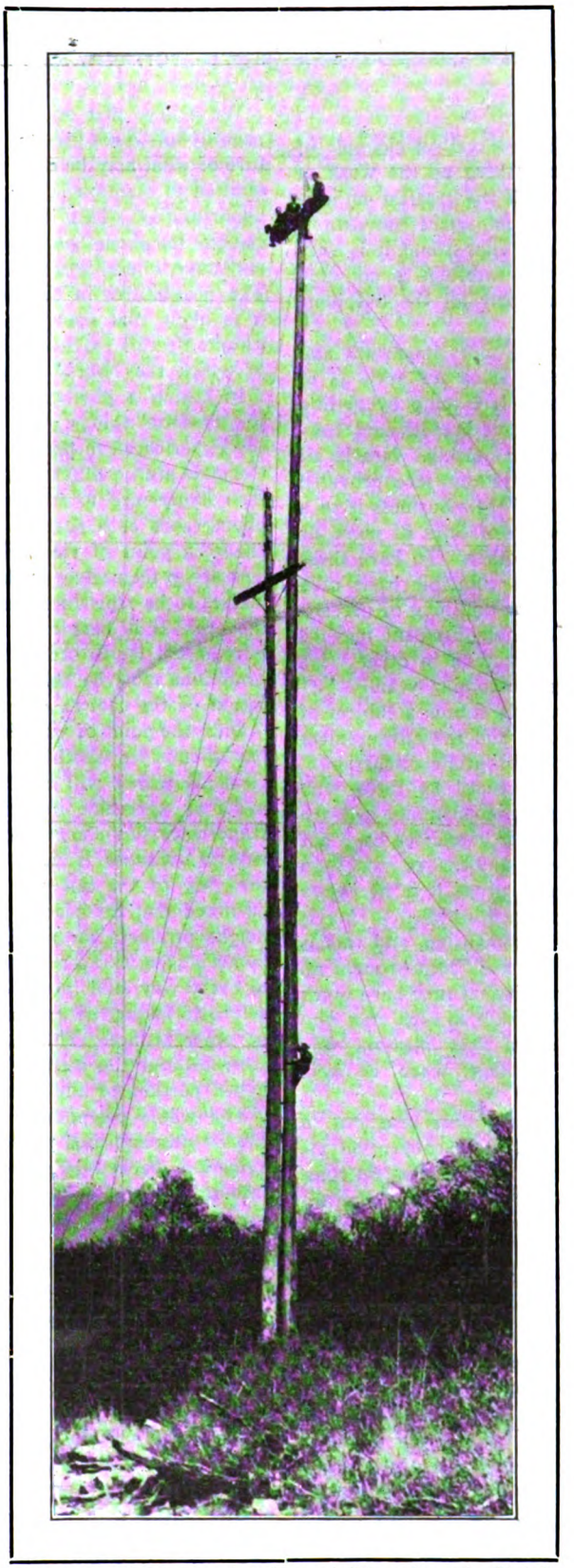
The Chehalis River Crossing

By C. L. Chambers.

FOR carrying telephone lines across broad rivers many remarkable examples of the skill of the telephone engineer have been erected. The necessity of supporting the wires at a considerable elevation and providing a substantial construction has in many portions of the country led to the employment of more or less elaborate and costly towers of steel. It is from its simplicity, so strikingly contrasted with these other methods, that the Chehalis River crossing in Washington is exceptionally interesting.

For fifteen years the Pacific States Telephone Company has supported its wires across this river between a 90-foot pole on the one bank, and a pole of similar height shown at the left of the illustration on this page. The former structure is on a bluff which rises 125 ft. above the water about a mile east of Aberdeen. Last fall the necessity for supporting the wires at a sufficient height to enable the largest ocean ships which freely go up and down the river to pass beneath without striking their masts led to the erection of the remarkably tall pole shown at the right of the old one. This surpasses in height the former stick by 36 ft., making the total height 126 ft. The new pole is 18 inches in diameter at the butt, and 8 inches at the top. It was made from a fir tree, which was cut on the bank of the river 12 miles east of where the pole now stands, and it was towed down in the water by a tug boat and mounted opposite where it is now placed. As its weight is about 6,000 lbs., after it had been brought to the proper point on the shore by the tug boat its subsequent handling was no slight affair. It was taken from the water and raised with a ten horse power hoisting engine, six men being required to handle it. For making attachment to the pole and moving it a 5/8-inch steel cable was employed, run through 10-inch steel blocks. The pole was set 12 feet in the ground, and guyed with four 1-16-inch steel stranded wires at the top, and also guyed about 40 feet from the top with four 5-16-inch stranded wires. The guys are fastened to dead men set in the ground to a depth of 8 ft. These dead men are of cedar 8x8 inches in section, and 7 feet long.

Although the steps upon the old pole show clearly those upon the new one are so placed that they are not visible from the point from which the photograph was taken. They are, however, provided, being 5/8 by 10 inch galvanized steps of the usual type. Ample support for the wires is furnished by cross arms of the ordinary style, 4x4 inches in section, and 10 feet long. These are fastened with one 5/8-inch machine bolt through the center of the pole, and one 5/8-inch bolt through the double arms 8 inches from the pole on either side, and one 5/8-inch double arm bolt on each end of the double arms. The span between the poles on the opposite sides of the river is 900 feet, and the wire used for the purpose is ordinary No. 14 steel galvanized wire.



Remarkably Tall Pole used to Suspend Wires above the Chehalis River, near Aberdeen, Washington.

The straightness of the large pole, as shown in the photograph, is worthy of note.

Aside from its value as illustrating an interesting piece of construction, the illustration, made from a photograph furnished by Mr. H. E. Bailey, the county manager of the telephone company, offers an unusually interesting demonstration of the fact that pictures of telephone work can be made attractive from an artistic standpoint. The pleasing effect produced by the skilful grouping of the linemen is an important feature of this photograph.

ARGENTINE REPUBLIC DEVELOPING LARGE TELEPHONE SYSTEM.

THE growth of the telephone industry in Argentine is indicated by the increase in the capital stock of the United River Plate Telephone Co. For the purpose of extending lines in Buenos Ayres, La Plata, Rosario and other towns 10,000 new common shares have been issued increasing the outstanding capital by £50,000. Recently new common battery switchboards and underground cables have been added to the company's plant and many other improvements completed.

Receipts for the year increased £30,000, while maintenance charges likewise showed an increase of £21,000. The net profit for the year was £7,823 better than last year and a dividend of 5% making a total for the year of 8% has been declared.

The visit of Secretary Root to this country, the progress of which is being recorded from day to day, is attracting the attention of people throughout the United States to its immense resources and prosperity. It appears that systems in the larger cities are already in fair condition, and further telephone development should follow.

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THE EDITOR'S PAGE

STATE CONVENTIONS.

INDEPENDENT telephone men, with the excellent example of the national convention in mind, are taking up the work of state organization and development with the greatest enthusiasm. Already dates have been set for the important conventions of the New York and Pennsylvania associations, and it is very pleasant to learn that the interest in these meetings is not only hearty and earnest, but is felt by practically all the telephone men in these two states.

In the present state of development the most important and vital questions before the operating companies are such as to call for united effort in a special sense. It is only by getting together and discussing them with the utmost breadth and freedom that the desired ends may be reached quickly. Nearly all the companies have reached a point where they are provided with some toll facilities, and the growth of their business is to a large extent dependent upon the extension of lines of more or less length to connect one system with another. To have these lines put in operation on a profitable and equitable basis calls for much consideration and discussion. The outlining of necessities of this nature and plans for their accomplishment may be taken up more easily at a general meeting than in other ways and will receive much attention during the coming year.

Standardization of equipment and methods is now a subject of which the importance is fully appreciated, and the advancement of this, too, may be greatly hastened by appropriate discussion.

Not the least of the advantages experienced by those who are active in state meetings comes from the opportunity to learn the methods of gaining business which their associates have put in successful operation. A telephone company makes money on its service, but before this service can be given it is necessary to create a demand, and get the telephones installed. This is accomplished by advanced methods of salesmanship, and this is a thing about which those managers who have "been brought up in the telephone business" will usually admit that they have much to learn. An interchange of experiences affords to each man who participates an opportunity to learn in a very pleasant way things which he can use to his advantage when he gets home.

There are few forms of activity which are more beneficial to the participants than those for which the state convention affords an opportunity, and it is well that all the Independent companies are planning to do everything in their power to strengthen their organizations during the coming year.

TELEPHONE PHOTOGRAPHY.

BEFORE this we have taken occasion to emphasize the value of using the camera to obtain pictures of features of telephone work of which a permanent record is desired. Photographs of this sort are perhaps wanting in the absolute definiteness possessed by a complete and accurate set of drawings, but they undoubtedly possess advantages which, in the ordinary course of events, are never attained in drawings of the class used in actual practice. Although they do not show dimensions accurately they do show proportions, and present most of the essential features of an object in a way which makes them evident almost at a glance. An additional advantage which the photograph has over other methods of representation is that it not only shows an object very clearly as a whole, and also in detail, but shows the surroundings as well. This is in many instances a thing which has much practical value.

We believe that one of the illustrations presented on another page of this issue gives an opportunity to call attention to a feature of what may be called telephone photography which we have omitted to mention in the past, although we have had numerous opportunities. This is the fact that to the skilful user of the camera telephone work presents opportunities for work which may have, in addition to its practical value, genuine artistic merit. The possibilities in this direction are so little appreciated that it is likely that many of those who would feel an inclination to take up this extremely interesting work let slip many chances of which they would be glad to avail themselves.

In taking a photograph of telephone equipment there are a few essential things which, if borne in mind, will enable a person experienced in photography to attain excellent results. These elements are no different from those which are a matter of common experience to men who have undertaken to secure good photographs as a pastime. In the first place, it is necessary to choose a point of view which will make the objects before the lens group themselves in the manner which will cause the various masses to be reproduced in the manner which is most pleasing to the eye. It is here that the most forethought and imagination is required, for in order to produce the best results the lighting conditions must be held in mind, in order that the very best location of the camera may be made available.

Once the point of view has been settled upon, the photographer has to consider whether he can add to the object before him any elements which will aid him in producing a result which will make an agreeable impression upon the persons who view it. Experience has shown that the proper grouping of persons in natural attitudes is the best method of securing this end. In the view of the tall pole to which we have alluded it should be noted that the placing of a man at a point part way up its height produces an effect which would hardly be looked for by an inexperienced person. It makes the picture better balanced in every way, and in addition brings out the essential and characteristic feature of extreme height as could be accomplished by no other artifice. This feature, however, would fail of its purpose without the men on the crossarm to give strength to the upper portion of the view.

The whole composition is an admirable illustration of what can be accomplished in this line by a consistent use of the imagination, backed by experiment. Telephone men branch out into photography altogether too little for their own good. A trial, with a little patience in the beginning, is sure to bring an enthusiasm which will lead to the doing of work which will more than pay for the time expended.

THE PROTECTING TELEPHONE.

BURGLAR insurance may be a very good thing, but it will not prevent robberies. After a house has been entered and a few valued treasures carried away it is poor consolation that a certain money equivalent is obtainable. Then, too, many people lack even this consolation. They take the whole risk and lose all.

The telephone is coming to be an instrument of which the modern house breaker is more in fear than of the traditional shot gun. The man with an extension set at his bedside can quietly summon the whole police force if he hears a noise in another room. Extension sets for timid people should be the cry of the telephone manager in every town where crimes of this sort are prevalent.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

REMEDY FOR BREACH OF CONNECTION CONTRACT.

I have a line connected to the switchboard of another company, also a contract with them for several years to come for all toll business giving me the exclusive business out of their town over their switchboard to towns I have connected from my own lines over their switchboard. The other company is now talking of going to a third company for all toll business. I wish to know what can be done in the matter and where all the cases can be found covering the ground for permanent injunction and damages.

C. W. G.

IF this company fails to keep its contract with you, there are three remedies. One is to sue it for damages for breach of contract, another is to secure an injunction preventing it from connecting with your rival company on the ground that it has an exclusive contract with you and a third is to compel it by mandamus to connect with your company. See State v. Nebraska Telep. Co., 22 N. W. 237; Telephone Co. v State, 118 Ind. 194, 123 Ind. 113; Campbellsville Co. v. Lebanon Co., 80 S. W. 1114.

POWER OF NEW YORK MUNICIPALITIES TO FIX RATES.

A LAWYER in Gloversville, N. Y., brought suit against the Glen Telephone Company, alleging that it had refused to supply telephone service to him at reasonable rates and refused to give him telephone service except upon payment of $3.50 per month, while $2 per month was a reasonable charge, and that the company was discriminating against him, and in favor of other professions, and of other places of business. The rate of $2 at which he wished to receive service was established by the franchise of the company adopted by the municipal authorities. The court held that the lawyer's contention that he was entitled to service upon the terms stated in the so-called franchise was not sound, because the right to construct the telephone line upon the highways of the state was given by statute and the right of the city was only to regulate the setting and stringing of poles and wires. "The power of the municipality is simply a police power to be exercised for the protection of the citizens. It cannot use that power for the purpose of forcing a contract with a telephone company for the benefit of itself or the citizens." The court also held that the company was not estopped from alleging that the franchise was not a binding contract because it had previously complied with it. Wright v. Glen Telep. Co., 99 N. Y. S. 85.

SUIT FOR CHARGING WATER PIPES WITH ELECTRICITY.

A PECULIAR complaint is made in a suit brought by Mr. and Mrs. Ephraim Feldman against the Maryland Telephone and Telegraph Company at Baltimore, Md. They allege that on July 22, while the company was erecting a pole in front of their house, the pole fell, breaking a charged wire which bounded toward the building, charging the pipes and spouts with electricity, and causing a current to run through the house. As a result their property was considerably damaged, so they allege.

TELEPHONE EMPLOYEE INJURED BY ELEVATOR.

THE contract between a telephone company and the proprietor of a building in which a telephone was located required the company to keep the instrument in order. On receipt of a request from the proprietor of the building an employee of the company was sent to make repairs. While he was in the elevator shaft during the progress of his work the elevator was moved and the descending counter weight injured him severely.

Before going into the shaft the employee had notified the operator of the elevator and the operator had promised not to move the elevator while he was at work in the shaft. It was held that the promise of the elevator operator was within the scope of his employment; that the telephone employee was upon the premises at the invitation of the proprietor of the building, and that a verdict for the plaintiff should not be reversed. Rink v. Lowry, 77 N. E. 967.

JURISDICTION OF COUNTY COMMISSIONERS.

We applied to the Board of County Commissioners of Crook Co., Wyo., for a 30-year franchise to construct, own and operate telephone lines on the public highways of said county. Said application was rejected on account of the Board not having jurisdiction. Could you inform us who has jurisdiction if the Commissioners have not? W. R. T. CO.

IT would seem to the legal editor that the proper authority to whom to make application for a franchise to construct, own and operate telephone lines would be the Secretary of State of Wyoming. This would really be an application for incorporation and the act of incorporation no doubt provides for the granting of this privilege to any company incorporated under it. After you have taken that step it would then the proper to apply to the county commissioners to designate a route for your lines through the county. The distinction we are making is that the franchise to act as a telephone company comes from the State, while the designation of your route over the public highways comes from the county.

INJURY TO EMPLOYEES MAKING ALTERATIONS IN ELECTRIC SWITCHBOARD.

AN unskilled laborer in the employ of an electric company was charged with the duty of making repairs about the building, and at one time in the day ascended a ladder carrying in his hand a wrench with which to turn the burr at the upper end of some rods extending over the iron frame of a switchboard through the pole or beams suspended from the truss work of the roof. While so engaged he reached up with his left hand and, evidently to assist in supporting himself on the ladder, took hold of an upright iron rod supporting the roof. When next seen he was standing on the ladder stiff and rigid with outstretched arms, and upon the current being turned off, fell to the floor dead. Suit was brought against the company upon the theory that by its negligence the frame of the switchboard and with it the iron rods by which its weight was suspended from the pole had become charged with electricity, and that when the laborer, with one hand, brought the wrench in contact with the upper end of the suspending rod, and with the other grasped the iron roof, a circuit was completed for the discharge of the electric fluid. Experiments made soon after the accident showed that this theory was fairly maintainable. The defendant appealed from a verdict for the plaintiff and carried the case to the Supreme Court of Iowa, where it was reversed. The ground for reversal was that the burden was not upon the electric company to prove that the deceased had assumed the ordinary risks of the employment as the trial court had held. The Supreme Court also decided that the fact that the deceased was engaged in making alterations on the electric switchboard did not relieve the company from using such reasonable skill and care to provide a safe place as though the apparatus was completed. Martin v. Des Moines Edison Light Co., 106 N. W. 359.

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IN THE OPERATING FIELD

INDIANA INDEPENDENT TELEPHONE COMPANIES MAKE LARGE EXPENDITURES FOR IMPROVEMENTS.

THE progress and development of the Indiana Independent Telephone companies is evidenced by the large expenditures being made this year for improvements. According to recent reports a partial list of appropriations which have been made for improvements, many of which have been begun, is as follows: At Richmond $150,000; at Indianapolis $17,600; at Franklin $7,000; at Columbus $9,000; at Covington $10,000; at Clinton $35,000; at Trafalgar $3,000; at Wabash $40,000; at South Bend and vicinity $100,000, and at Marion $75,000. The above appropriations include a new building and underground system in Richmond, a new building and switchboard at Wabash, a new switchboard at Indianapolis and similar installations in the other cities named. In addition to the above the Terre Haute Citizens' Independent Telephone Company has just completed a new exchange building and conduit system and cut the wires into a new board of 5,000 line capacity.

The New Long Distance Telephone Company has recently put up four new copper circuits and is now working on four others. When these are completed the company will have eighty-four toll line circuits entering Indianapolis.

THE TELEPHONE AGAIN EMPHASIZES ITS UTILITY AS A LEGAL INSTRUMENT.

THE labor saving and time saving properties of the inventions of the past half century are but little appreciated by the generation that benefits by them. We take these things as a matter of course, with little or no consideration of the drawbacks and obstacles their absence meant to our fathers' fathers.

In countless ways the telephone, for instance, has shown its convenience, and its omission now would prove an almost irreparable loss. A novel way of utilizing its benefits was exhibited in a village near Marion, Ohio, a few days ago.

One of the farmers of an adjacent township was reported to have violated one of the village regulations. When the mayor of the place heard of the case he was wroth. He called up the farmer at the latter's country home and charged him with the offense. The farmer said he was too busy with his crops to go to town and answer the charge. After the mayor had considered a moment he asked the farmer if he was guilty, and the latter admitted he was; whereupon the mayor fined him $8, and the farmer said he'd remit the amount by mail. The mayor then hung up the receiver and adjourned court simultaneously. Thus was the outraged law satisfied and its dignity asserted, while the guilty man pursued the agricultural tenor of his way without any interruption.

HARRODSBURG, KENTUCKY, WILL DO WITHOUT BELL SERVICE.

A FEW days ago the franchise of the East Tennessee (Bell) Company at Harrodsburg, Ky., expired. When the company asked for a new franchise the city wished to insert a rate limiting clause. The company not only refused to accept such a franchise, but proceeded arbitrarily to raise its rates in the city and county. Moreover, not only did it act in open defiance of the governing body of the city in this way, but asserted that if its franchise were not made in the terms it wished that it would withdraw its exchange completely.

This proposition has been heard of in Kentucky before, and is put down nowadays as a well known bluff of this organization. In this town it failed to work. Meetings were held and a new company was organized headed by the business people of the town. The franchise was sold publicly and bought by F. P. James, cashier of the Mercer National Bank, who represented local capitalists, who took up within a few minutes $10,000 worth of stock. It is said that steps will be taken at once to construct a new Independent system to connect with the lines of the Home Telephone Company of Louisville. Not only has the Bell company lost at one stroke all of its business in the city, but it has been ordered to pay back within a certain specified time all excess rentals collected.

TO OUST CENTRAL UNION TELEPHONE COMPANY.

AT Moline, Ill., an information in quo warranto has been filed by the State's Attorney against the Central Union Telephone Company. The information questions the company's right to operate its lines in Moline. It sets up the failure of the company to comply with the express requirements of the ordinance of 1885 that the poles be placed under the supervision of the street and alley committee of the council, and the failure to comply with the implied conditions of a good plant, up-to-date service, reasonable tolls, and courteous treatment. The information declares the original ordinance void owing to the contravention of the constitutional provision against making irrevocable grants, and alleges the repealing ordinance to be valid.

THE MARKETMEN OF PROVO DISCARD BELL TELEPHONES.

ALL the butchers and grocers of Provo, Utah, have had the Bell instruments removed from their stores. This drastic step is due to the failure of their association to persuade the telephone company to reduce its rate $1.00 a month. The Bell company was charging $48 per year, while the Utah Independent Company offers a rate of only $36 for individual line service. The Independent company is especially well pleased at this very strong testimonial to the superiority of the facilities which it offers.

PEOPLE IN PARSONS, KAN., PROTEST AGAINST BELL FRANCHISE DEMANDS.

IN Parsons, Kan., the Bell company has recently made application for a new franchise in which it attempts to dictate to the City Council some very interesting terms. In an earlier franchise which was brought up for consideration it was provided that the company should have no poles within certain districts excepting those necessary for the purpose of "distributing wires from manholes to the promises of subscribers." The telephone company has ingeniously modified this to read "from the main poles to the premises of the subscribers." This is an attempt to secure to itself the right to distribute from poles throughout the entire town. When this was discovered the situation gave considerable amusement, but also aroused a great deal of opposition which might be expected to be produced by such a petty example of sharp practice.

The hardest stroke in the new franchise, however, was one made at the pocketbooks of the citizens; for in the earlier franchise certain rates were laid down which have been considerably modified for the purpose of the present application. Although a sliding scale was adopted, as was done in the former franchise, the limiting numbers and rates applying to the telephone company at different periods of the growth of its city system have been so modified as to afford the company a great advantage over what it would have had under the earlier ordinance. The people of the city are bringing strong influences to bear on the Council to have the franchise modified to make terms which they consider more just and satisfactory.

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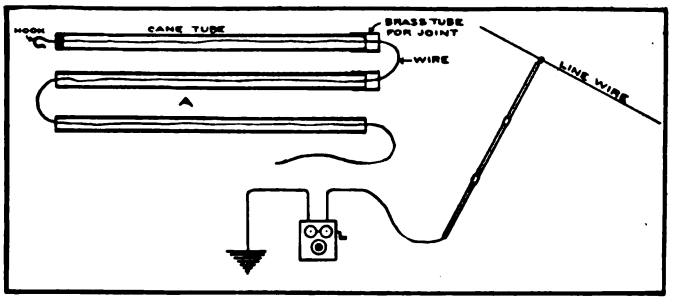
INDEPENDENT TELEPHONE COMPANIES ORGANIZE AT A MEETING AT HENDERSON, KY.

THE members of the Fourth District of the Kentucky Independent Telephone Association met at Henderson recently. Representatives of thirteen Independent systems were present. Committees were appointed to assist in the work of organization among the Independent operators in the vicinity, for the improvement of telephone facilities and the protection of common interests. The officers of the association were elected, as follows: F. G. Hoge, Hopkinsville, president; W. G. Turpin, Henderson, secretary and treasurer.

A DEVICE FOR RURAL LINE INSPECTION.

By Charles Claydon.

MEN who are travelling along the route taken by rural lines, looking for trouble, etc., frequently have occasion to call the home office or one of the stations. The following device, designed by the writer, has been found to make the inspector's work more easily accomplished than if he carried



Arrangement for tapping test set to grounded line by means of a wire led through an extensible cane pole.

climbers and put them on and climbed up a pole each time he wished to make a test.

The device consists simply of a triple jointed cane tube, which may be put together in the same way as a fish pole. It carries a wire or lamp cord through the center, terminating in a hook fastened in a plug at the upper end. The wire at the lower end may be terminated in suitable snaps for fastening to a telephone or test box. If it is used on a grounded line a ground rod and mallet may be carried, and still the work of connecting to a line and talking is easier than is possible for a person who has to hold tightly to a pole without cross arms. Of course, a double cane would be necessary for a metallic line. This device may be carried in a buggy or on a horse's back, and as it weighs but a few ounces and can be put together in a few seconds, it has given very good results in actual service.

BOOK REVIEWS.

The Practical Telephone Handbook, by Joseph Poole, A. I. E. E.; 524 pages, 473 illustrations. Published by Whittaker & Company, 2 White Hart street, London, E. C., England. New York publishers the Macmillan Company, 66 Fifth avenue. Price $2.00.

In the third edition of this well known book the author has provided about double the amount of matter which appeared in the previous edition, with about 200 more illustrations. It covers the field of British practice very thoroughly, and as this naturally includes the systems adopted by the National Telephone Company, which are little different from those of the Bell company in America, the very complete outline of central office apparatus and its uses will no doubt be useful to American students. The chapters devoted to testing for faults, etc., contain some information which is presented in a clear and attractive manner. An amusing thing, however, is that in this book, published in 1906, directions for adjusting the Blake transmitter should be included in the portion of the book devoted to testing and adjustment of apparatus.

General consideration is given to various kinds of telephone systems which have come into use, to underground and aerial construction, and to traffic work, in addition to the many chapters devoted to sub-station and central office apparatus. The book forms a very complete outline of the present state of the art, subject to the limitations stated by the author.

Moody's Manual for 1906, published by The Moody Corporation, 35 Nassau street, New York City, is out and is being distributed to subscribers. It grows larger every year and this seventh year issue finds it a volume of over 2,800 pages. Those who have been familiar with the Manual since its first modest appearance, seven years ago, when it was devoted only only to industrials, have noted its broadening scope year by year, until now it is claimed to be the most complete compendium issued in this country of all assuming to give generally statistics of corporation securities.

The book comprises ten sections, which deal with railroad and commercial securities.

In the telegraph, telephone and cable section, Moody's Manual is said to be 159 per cent. ahead of the combined listings of three other similar publications. It is, indeed, remarkably complete and covers the field thoroughly and without prejudice.

Moody's Manual is recognized as a standard reference book and has become invaluable to all who require accurate information in regard to corporate organizations. Its price is $10 per copy, being only about $1 per pound, or at the rate of 60 cents per thousand statements.

Handbook No. 17, by the Standard Underground Cable Company, Pittsburg, Pa. Contains 228 pages and is well illustrated. Price $0.50, $0.75 and $1.00, according to binding.

While this book is primarily a trade publication, as stated by the company, it contains an unusual amount of general information. Moreover this is so well selected and arranged that it should make the book especially useful to all those who have to do with work upon wires and cables. Although this is the seventeenth edition of the handbook all the material is new in statement and arrangement. Included in the final chapters are working directions for placing, splicing and connecting electric cables, which take up the various points involved in such work in detail, giving instructions and illustrations which are frequently taken from photographs of work as actually performed.

The methods of locating faults under various conditions in practical cable work are shown, and the diagram and calculations are given in a form which makes them easy to use.

The chapter giving general electrical information includes many useful tables, statements of facts and methods of calculation which are likely to be referred to frequently.

The company states that one copy of this book is being sent gratuitously to each of its customers and to all executive officers of the larger corporations using such material as it manufactures. In order, however, that any one interested in the subject may be able to secure a copy it has decided to put it on sale at the very low prices stated above.

NEW YORK CITY FRANCHISES TAKEN OVER BY OWNERS OF THE CONSOLIDATED TELEPHONE COMPANY OF BUFFALO.

ANNOUNCEMENT has been made by B. G. Hubbell, president of the Consolidated Telephone Company, of Buffalo, N. Y., that a group of capitalists controlling the Consolidated company and its seventy subsidiary companies has taken over the Great Eastern Telephone Company and all its franchise rights in New York. This includes the conduit franchise of the Electric Lines Company and the Brooklyn franchise owned by the Great Eastern Company.

It is said that President Hubbell and his associates are so confident of the validity of the rights which they are acquiring that they are making preparations for pushing the construction of the New York system as soon as their rights can be passed upon by the court.

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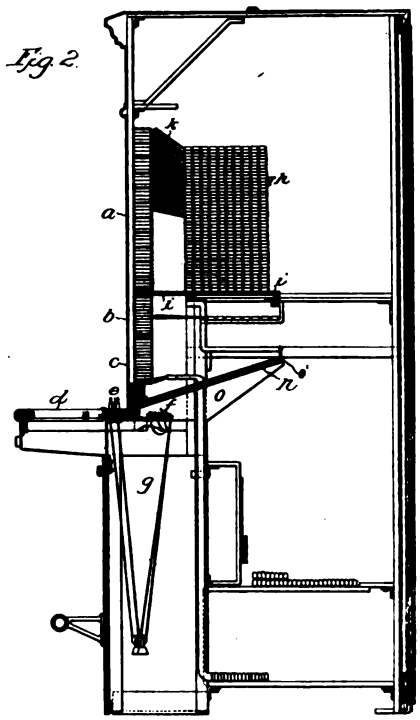
TELEPHONE PATENTS

SWITCHBOARD CONSTRUCTION.

Benjamin F. Merritt, East Orange, N. J., patents (No. 826,680; dated July 24, 1906; filed August 7, 1905; serial No. 272,961) and



assigns to the New York Telephone Company, New York, an improvement in multiple switchboard construction.

The inventor provides a switchboard in which the various divisions are separated by panels of fireproof material so arranged as to impede the spread of incipient fires. A vertical section of the board is shown in Fig. 2. The longitudinal fireproof shelf *i* supports the multiple cables *h*, and isolates the exposed and inflammable wires *k* from the lower portion of the switchboard. The cord shelf is shown at *f* and just above it are a series of fireproof panels *n* designed to protect the apparatus above from any heat or flames which might originate in the cord space. The panels *n* are supported in transverse steel brackets *o* which extend diagonally across the space above the cord shelf. Inclined channel-irons o^1 o^1 are provided on these end plates, forming guideways in which the partition-sections *n n* may slide in and out. Panels of fireproof material separate each section from those adjoining.

TELEPHONE RELAY.

Edward E. Clement, Washington, D. C., patents (No. 823,763, dated June 19, 1906; filed June 16, 1898; serial No. 683,651) telephone relay.

The elimination of the time constant, which is a serious difficulty in relays using massive movable parts, is the object of this invention. With some telephone relays and repeaters which have hitherto been devised it has been the practice to employ an electro magnet, securing the variation of resistance by the compression of a medium in the secondary circuit through the movement of the armature. The inventor discloses a means for making the resistance varying medium of magnetic or partially magnetic material. By including this medium directly in a magnetic circuit, so arranged with relation to the primary line as to have the amount of flux change to correspond with the variations of current in the line, the inventor makes the magnetized particles cling together more or less closely according as the magnetic circuit of which they form a part is strengthened or weakened by the voice currents.

Placed in such a manner as to completely close the field of a magnet is a suitable receptacle which may contain magnetic material of the following nature. Irregularly shaped granules of very soft Swedish iron coated with shellac mixed with about an equal bulk of fine granulated carbon; all granules of magnetic material prepared by being given a coating with a carbonaceous material; also by the use of a carbon of sufficient hardness and high enough quality to carry considerable current without deterioration. In this case the effect is to render the granules carrying the current susceptible to magnetic influence on account of the field created in the neighborhood of each particle by the current.

TIME REGISTER.

Gustav Furst, Pozsony, Austria-Hungary, patents (No. 816,456; dated March 27, 1906; filed January 29, 1904; serial No. 191,190) a time register for telephones.

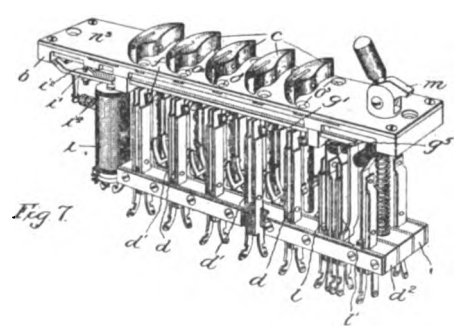
The object of this invention is to provide a means for recording the time consumed in using a transmitter during a conversation; the period when listening takes place not being recorded. This the inventor accomplishes by providing a means for breaking the transmitter circuit while listening, so that the recording mechanism becomes inoperative.

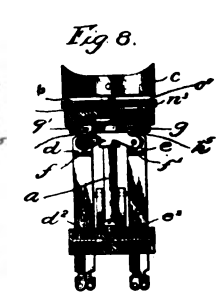
This patent relates to a system of time recording entirely foreign to American practice, in which are involved principles of operation which are not accepted in this country at the present time.

SWITCH KEY.

Edward B. Craft, Chicago, Ill., patents (No. 828,089; dated August 7, 1906; filed July 5, 1904; serial No. 215,209) and assigns to Western Electric Company, Chicago, Ill., a switch key.

The inventor describes a key embodying five shafts which he claims may be used to signal subscribers on a ten-party line. The key is used in connection with a continuously rotating commu-





tator of special design adapted to furnish to each switch in the key currents of distinctive characteristics. Fig. 7 is a perspective view of the key and Fig. 5 a sectional view with one shaft in an actuated position. Fig. 8 is a vertical transverse section of the device. When it is desired to call a subscriber the handle of the key adapted to send out over the line current which will actuate

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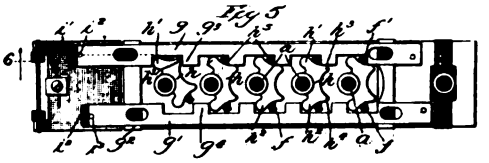
the signalling apparatus at the required station is turned to the right or left as shown in Fig. 5. The cam *h* engages with a tooth in the sliding rack *g* and moves this rack until it is latched by the pin i^3 mounted on the spring controlled armature i^1 of magnet *i*. The construction of the cams is such that all the shafts except the one turned are locked by the bars *g* g^1 when one of the latter is advanced by the actuation of a single switch. A target *o* associated with each key shows what line is in use. The movement of a locking bar actuates a circuit controlling switch, such as *l*, operated by bar *g*. This switch is arranged in a circuit so designed in connection with the special commutating arrangements on the ringing generator that the desired subscriber is automatically rung, and after this has been accomplished the magnet *i* is energized, and the locking bar released and returned to its normal position. With apparatus fulfilling the specifications of this patent, to signal any subscriber it is simply necessary to set the required key and then after the proper signal has been



transmitted over the line the apparatus is all automatically restored to its normal condition.

POCKET AUDIPHONE.

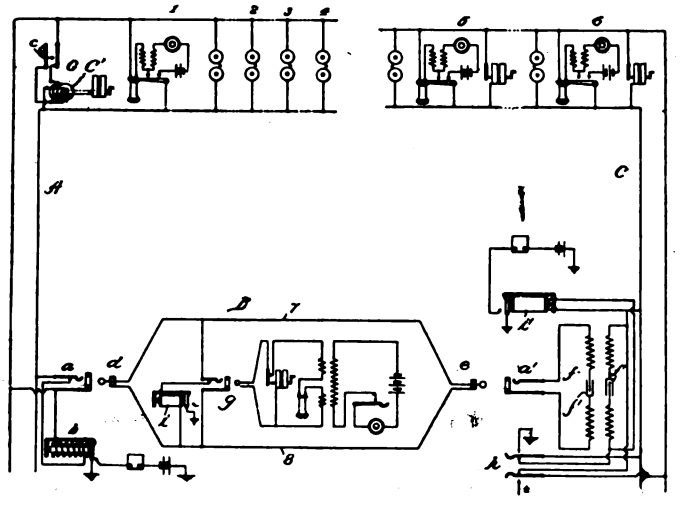
Eugene William Schneider, New York, N. Y., patents (No. 828,292; dated Aug. 7, 1906; original application filed Aug. 11, 1905; serial No. 274,017. Divided and this application filed Dec. 8, 1905; serial No. 290,931) a pocket audiphone.

The inventor provides an audiphone in which the battery and transmitter are contained compactly in the same case. All wiring is made as direct as possible so as to obviate the danger of twisted cords and broken leads.

TELEPHONE SYSTEM.

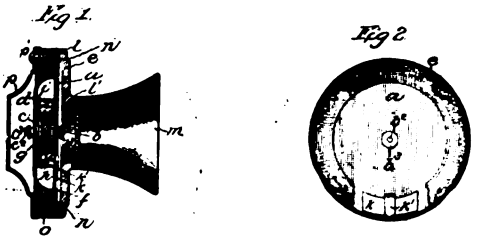
Charles E. Scribner, Jericho, Vt., patents (No. 828,061, dated Aug. 7, 1906; filed April 10, 1905, serial No. 254,763) and assigns to Western Electric Company, Chicago, Ill., a telephone exchange system.

This invention is intended to provide means whereby subscribers on a party line may call one another without operating the line signal at the exchange, and also whereby when such a subscriber is connected to a subscriber on another party line on which toll is charged, neither can call any other station on either party line without the assistance of the operator at the exchange. Each station on party line *A* is equipped with a generator *G* adapted to give either direct or alternating current and controlled by switch *c*. The line relay *b* responds only to direct current. Thus it is possible for a subscriber on *A* to call another subscriber on *A* without calling central. The line *C* is equipped with toll meters. The coil *f* prevents the passage of ringing current but allows talking current to pass. Therefore when subscriber 1 is connected with subscriber 5 neither can call up any other subscriber without the aid of the operator.

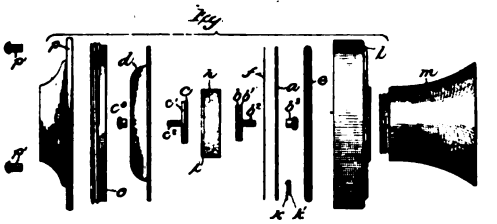


TELEPHONE TRANSMITTER.

Charles C. Gilchrest, New York, N. Y., patents (No. 827,625; dated July 31, 1906; filed March 25, 1905; serial No. 252,050) and assigns to the Western Electric Company, Chicago, Ill., a telephone transmitter.



In Fig. 1 is shown a section of the complete transmitter. Fig. 4 shows the several parts in the order in which they are assembled and Fig. 2 is a front view with the plate *l* removed and the insulating ring *e* cut away at *k*. The diaphragm *a* carries the carbon elctrode *b*, which faces a similar electrode *c* fastened to the metallic cup *d*. The inventor claims that this cup *d* confines the air between itself and the diaphragm so as to exercise a damping effect, as does also the felt chamber *h* containing the granular carbon—thus making it unnecessary to employ a spring for this purpose. The diaphragm is insulated from the shell by



the flat washer *f* and the rubber band *e*, which also serves to keep it under tension. The externally threaded annular nut *o* holds the assembled parts in place. The plate *k*, which serves as a circuit terminal, is in contact with the diaphragm. It carries the lug k^1, and this lug in turn comes in contact with the metallic case. The other terminal *c* connects with the binding post c^3, which is insulated from the case.

MOUTHPIECE.

Frank C. Fisher, Cheltenham, Pa., and W. C. Calin, Camden, N. J., patents (No. 819,531; dated May 1, 1906; filed Oct. 30, 1905; serial No. 285,050) a mouthpiece for telephones.

This invention discloses a design for a mouthpiece which will not break easily. It consists of a metallic frame, the funnel portion being covered on its interior and exterior with hard rubber or similar material.

SELECTIVE RINGING AND LOCKING DEVICE.

Orris H. Newman, Pekin, Ill., patents (No. 821,820; dated May 29th, 1906; filed April 3d, 1905; serial No. 253,553) a selective ringing and locking device.

The method of selecting described in this patent is designed to be controlled by the number of revolutions of the handle of the calling subscriber's generator. An electro-magnetic locking device is provided for preventing the motion of all receiver hooks of the various telephones on the line other than the one at the station with which conversation is desired. Means are provided whereby after the first ring, which must be made with a given number of revolutions of the generator at the calling telephone, connection is presumably established with the called party, and any number of subsequent rings may be made upon the line without further actuation of the selecting mechanism, for the purpose of repeatedly ringing the bell of the desired person if necessary.

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QUERIES

MULTIPLE OF ANSWERING LAMPS AT SPECIAL POSITIONS.—(753.)

Will you please explain to me the object of multipling answering lamps and jacks in order that a signal may be received at either one of two positions? I have been told that this was for night work, but do not see why it is necessary, as in our exchange, where we have not this scheme, we find that our experienced night operators are able to answer any call that comes in by locating it in the multiple, and they do this quickly. Is it not wholly unnecessary to provide this duplication in view of the very good practical results obtained by the method I mention? R. B.

The scheme of multipling answering lamps and jacks, and using a transfer key to throw a signal from one lamp to another, has been adopted in some places to provide a means of distributing a load at hours intermediate between the times when business is heavy and the night hours, when it falls away to almost nothing.

At these times it is inconvenient, and practically impossible to answer calls in the multiple in the way you mention. At the same time there is too much business to make it possible to get good service by permitting operators to move from one position to another, and the load is so light that the location of an operator at each position is not economical. The scheme of multipling answering jacks gives a means of transferring connections in such a way as to provide a fairly even and economical load at selected positions along the board, and in this way a few operators may satisfactorily handle the entire business of an exchange during the evening and early morning hours.

Where this plan is to be put into operation it is necessary to figure out requirements very carefully, making estimates for the cost of operating for present and future business and the cost of doing the work, as in many exchanges the margin between probable profit and probable loss from the adoption of this scheme is very small.

CURRENT FOR RINGING BELLS IN MULTIPLE. (754)

In connection with a house telephone system which we have installed, we recently put in a signalling system where there are several ordinary vibrating bells, designed to be rung all at once by pushing a button. The telephone bells are rung off the same battery that these special signalling bells are connected to. Now, although the telephone bells have a higher resistance than the ordinary vibrating bells, they ring all right, while the vibrating bells simply vibrate without having enough strength to strike the gong. If we take out the bells and test them they seem to work all right, and if we disconnect them all from the line it is clear—that is, there are no short circuits or shunts on it. We are unable to tell what the trouble is, and are wondering if you can help us. N. J.

If we understand the conditions, you ring one telephone bell at a time from a common battery, and have a call system with several bells connected in multiple, arranged to ring all together when a button is pushed, deriving current from the same battery as the telephones. Under these conditions what is required for your second system is a battery of low voltage, probably lower than is used for your telephone bells, but adapted to give considerable current. We would suggest that you use two separate batteries; one made up of a single string of cells in series, of the proper voltage to ring your telephone bells, and the other of the proper number in series to give the correct voltage for a signalling system. With the latter, however, you should make up several strings in parallel, so that you would not only have the proper voltage, but also sufficient amperage to pull the armatures up sharply. We think if you arrange your bells in this way you will have no further trouble.

USE OF 1,600 OHM BELLS ON FARMERS' LINES.—(755.)

Will you please explain to me why 1,600 ohm bells work better on heavily loaded farmers' lines than do those that have a resistance of only 1,000 ohms? O. N. J.

There seems to be more or less confusion on this point in the minds of some of our readers, owing to the fact that it is generally known that the smaller the wire is the larger current it takes; and there seems to be a belief that the use of a smaller wire, with consequent less resistance, would allow a larger current to be forced through these bells.

This, however, is not the case, as the magnetic effect, and hence the pull upon the armature is dependent upon the product of the current and the number of turns of wire. It will be found, by figuring out the arrangements which it is possible to make on a magnet coil, that this product is larger, with a given voltage, for the number of turns and current obtained with 1,600 ohm bells than it is with 1,000 ohm bells, and therefore the ring is better with bells of higher resistance.

TRANSPOSITION OF COPPER AND IRON CIRCUITS.—(756.)

Will two parallel circuits, one copper, and one iron, cross-talk if properly transposed? Would the method of transposition be the same as if both were copper, or both iron? C. M. D.

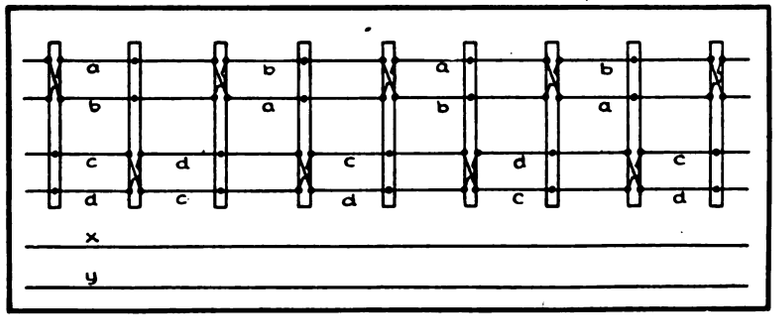

Fig. 756.

The method of transposing telephone circuits against a foreign circuit is independent of the material and, within commercial limits, of the size and therefore the resistance of the conductors. This is readily seen from the following discussion.

The influence of one conductor carrying current, throughout a certain length, upon a second, parallel conductor depends upon the current flowing in the first conductor, its distance from the second, and the character of the medium between them. This is true of both electrostatic and electromagnetic influence.

Referring to Fig. 756 we must first assume that the two wires of each circuit *a b* and *c d* are similar in size, shape and material and are carrying the same current in opposite directions at the same instant. It is then evident that the influence of one wire *a* upon wire *c* is equal and opposite to its influence on wire *d* and the two therefore neutralize each other in their effect upon circuit *c-d*. The same is true of the influence of wire *b* on *c-d* and of wires *x* and *y* on circuit *a-b* or *c-d*.

From the foregoing it is evident that this neutralization of influence is entirely independent of the absolute current flowing in any pair of wires, and hence does not depend upon their resistance, size or material.

That is to say: if *a-b* is a No. 14 iron circuit and *c-d* No. 8 copper the transposition shown will be as effective as if the two circuits were similar in every respect.

With regard to cross talk, there would be none between two circuits which were properly transposed and in perfect condition otherwise.

Poor joints causing the resistance to be greater in one side than in the other, and low insulation or tree grounds, causing leakage, however, tend to unbalance a line, and when these conditions are present to a sufficient degree the beneficial effects of the transposition are overcome.

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

CANADIAN OFFICE ESTABLISHED BY GOULD STORAGE BATTERY COMPANY.

OWING to the growth of its business in Canada, the Gould Storage Battery Company has found it necessary to establish an office close to the territory in which it is distributing so large a proportion of its product. It has, therefore, opened a Canadian branch office at 62-64 Wellington Street West, Toronto, Ontario, and this office has been placed in charge of Mr. P. B. Yates of the Gould Company.

The Gould Company not only has in its employ a complete corps of competent engineers, who are able to give expert advice, but maintains a telephone department which is especially useful to people who wish to know about the best methods of maintaining batteries after their installation, as well as the proper equipment to purchase. The company has now in press a booklet on telephone batteries, which it offers to send without charge to interested persons.

THE ELECTRICAL TIMES for August, published by the W. G. Nagel Electric Company, is now being distributed. It contains many interesting news items besides an article on the business and plant of the W. G. Nagel Electric Company. The company's growth is shown in tabulated form and many interesting views of the plant are given. Two pages are occupied by portraits of a number of the officers and salesmen. This company manufactures electrical supplies of every description.

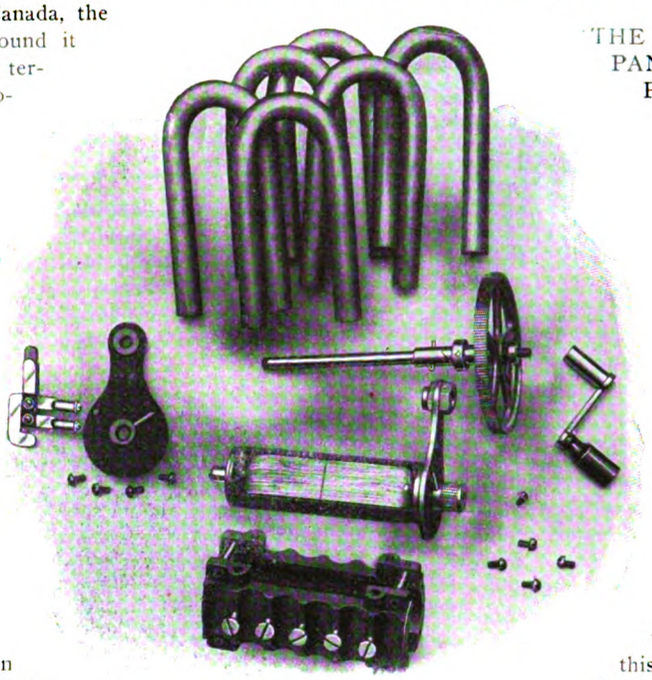

Fig. 2. Parts of American generator, disassembled.

THE AMERICAN COMPANY'S NEW TELEPHONE GENERATOR.

THE American Electric Telephone Company, Englewood, Chicago, Ill., has carried on a very extensive series of experiments, for the past year or so, with the object of producing a new line of telephone generators, which have resulted in a machine presenting a number of interesting points.

One of the distinctive features of this machine is the form of polarizing magnet adopted. The magnets, as it will be observed from an examination of the illustration (Figs. 1, 2) accompanying this description, are made up from round bar steel. The use of this steel, as applied, produces a machine of most pleasing appearance.

The polarizing magnet may be finished in any desired style, the standard finish being a white coating, and special finishes run from nickel-plated magnets to enameled magnets, any desired shade being applicable. All finishes other than the whitened finish, however, are considered of special character.

Mechanically the instrument is well designed. The automatic shunt or cut-in switch is of such construction as to insure lasting qualities and almost frictionless operation. The shunt is so constructed that a backward turn of the generator does not open up the shunt circuit nor cut the generator into the circuit while being used for bridging service.

The opinion of the experts engaged on the manufacture of this machine is that a cast armature, when made from a suitable grade of iron, is preferable to a laminated armature. Therefore, the American company's new armature is made from a special grade of cast iron. By using cast iron it is found practicable to produce a better job, mechanically, and to obtain first class results electrically. As an indication of this the company states that with an air gap of ten thousandths of an inch between the armature and the pole piece, it is possible to obtain a satisfactory current output from the machines. This large space between the pole pieces insures great lasting qualities of the generator for any slight wear on the poles will not immediately destroy the usefulness of the machine.

The generators are made up in three sizes. The series gener-

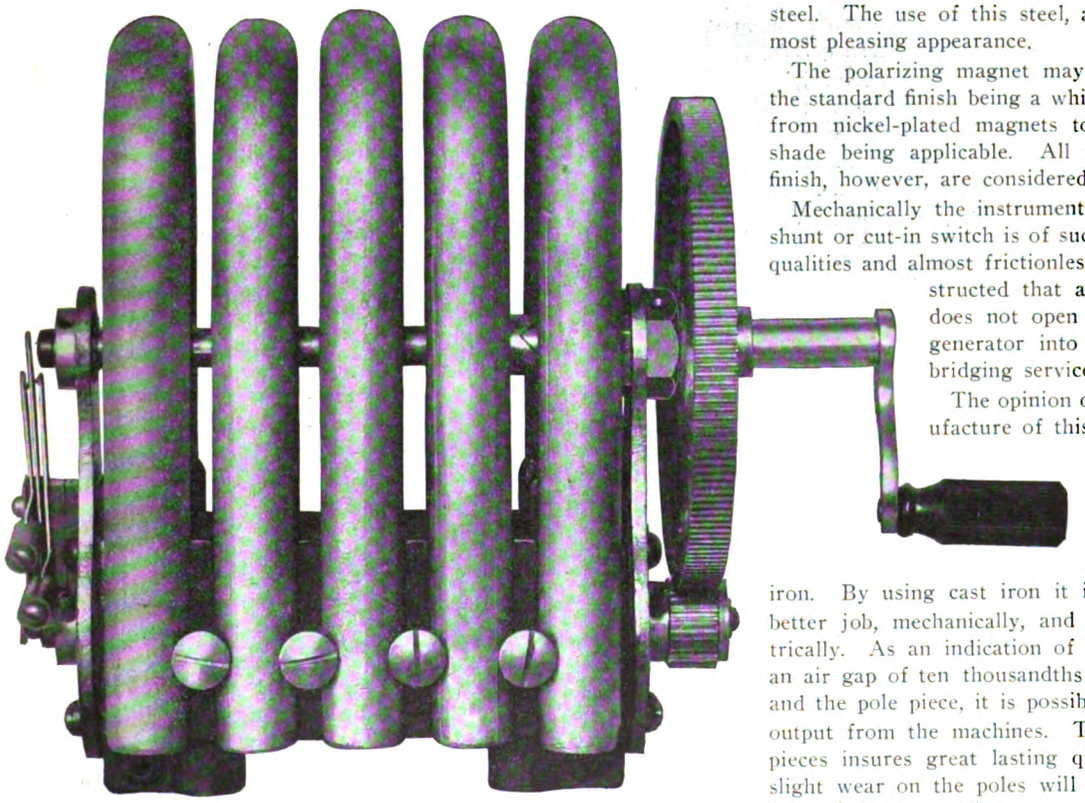

Fig. 1. New telephone generator with round bar magnets, recently put on the market by the American Electric Telephone Company.

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ator is wound to a resistance of 300 ohms and delivers current at 100 volts. The bridging generator is wound to 100 ohms and

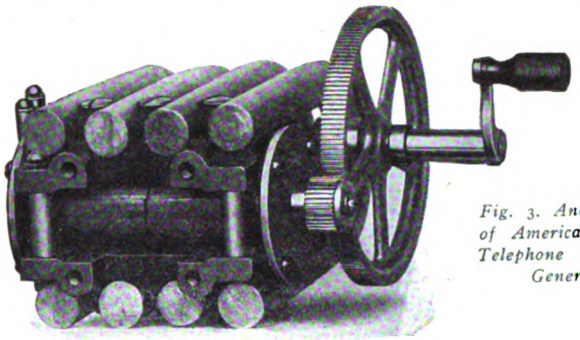


Fig. 3. Another view of American Electric Telephone Company's Generator.

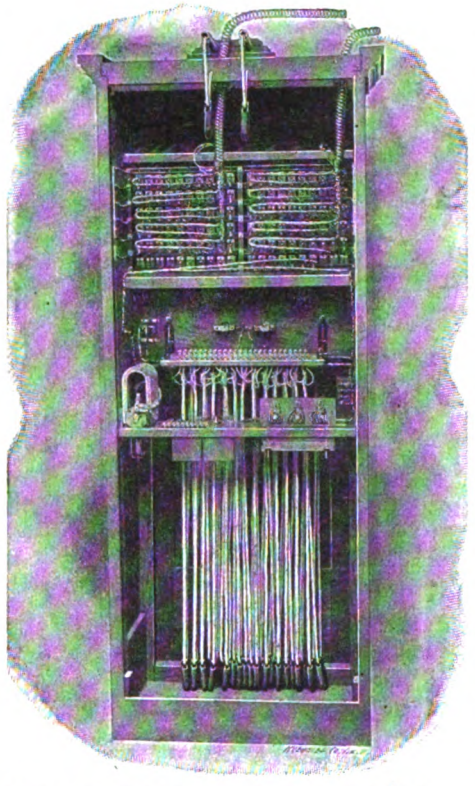
delivers current at 90 volts. The intermediate type of generator is provided with 5 magnets and wound to 200 ohms resistance, and delivers current at 100 volts. The series generator is of the 4 magnet type and the bridging generator of the 6 magnet type.

The bridging generator gives a current output of nearly three-tenths of an ampere, while the series generator, owing to its exceedingly low resistance, will deliver twelve-hundredths of an ampere.

An additional advantage of the American type generators is said to lie in the large size of wire used. The series generator is wound with No. 33 wire, the bridging generator with No. 29 wire, and the intermediate with No. 31 wire, thus insuring durability in the windings. A further very important feature is that the magnets are made of imported steel, the use of which permits of obtaining a very great magnetic strength which is said to be maintained at its original value indefinitely.

THE SUMTER UNITYPE SWITCHBOARD.

IN the center of this page is shown an illustration which gives an idea of the appearance presented by the magneto switchboard recently brought out by the Sumter Telephone Manufacturing Co., Sumter, S. C.



Rear View of the Sumter Unitype Switchboard.

In this view the wiring of the switchboard is shown very clearly. It will be remembered that the apparatus used in this board is so constructed as to be removable in units. The drops are all removable from the front of the switchboard, it being unnecessary to disconnect any wiring, which is run only to the jacks. Connection between the line and the drop is made by a special arrangement of springs, which comes into play as soon as the drop is inserted in its proper place.

The entire equipment is said to be constructed in a way which bears out the general idea which the company had in mind when it designed this switchboard, namely to make a board which should secure economy of installation and efficiency of maintenance in a very high degree.

THE BUCKEYE ENGINE CO., Salem, O., manufactures a line of blue printing machines which should be interesting to telephone companies whose bills for this class of work are getting too large. Descriptive matter can be secured on request.

THE FAHNESTOCK ELECTRIC CO., 129 Patchen avenue, Brooklyn, N. Y., reports that many telephone exchanges are purchasing large quantities of its No. 5 Spring Binding Post for use on cable heads. This post is very similar to the regular battery connector with the exception that it is fitted with a special lug to which the wire is soldered. A sample will be sent on request to any one interested, and also a copy of a new booklet showing the various styles of binding posts manufactured by the company.

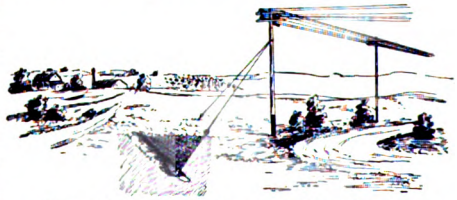
HENRY STANLEY RENAUD, B.S., LL.B., of Waller & Renaud, Consulting Chemists of 159 Front street, New York City, has recently been admitted to the Bar of the State of New York as an attorney and counselor at law. In connection with his work as consulting chemist, Mr. Renaud will devote his attention to chemical, techno-legal, chemico-legal, lego-mining and patent cases.

THE AUTOMATIC ELECTRIC COMPANY, Van Buren and Morgan streets, Chicago, is distributing a souvenir postal card showing its factory as it appears after the third enlargement. This addition which the company claims has been built "in accordance with the law of supply and demand," will enable it to greatly increase the output of telephone material. An interesting catalogue may be had on application to the company.

THE STANDARD MANUFACTURING COMPANY, 268-272 Noble Avenue, Bridgeport, Conn., has recently let a contract for a three-story brick building 91 feet long and 32 feet wide, with a boiler house 24 feet long by 20 feet wide. The new building will be of modern construction throughout, and will be equipped with an elevator and fire proof vaults. In it will be manufactured the automatic gear cutter, for which many orders have been received. After the new plant is completed the company intends to devote more attention to the manufacture of telephone and electrical apparatus, the demand for which will necessitate the employment of three times as much help as the company can now find room for.

SECURITY FOR CORNER POLES.

A PIECE of line construction which causes a very heavy strain on a corner pole is shown in the accompanying illustration. The only way to make a pole stand up under these conditions is to set a substantial guy in line with the poles run in each direction. In the drawing, which was furnished by The W. G. Nagel Electric Company, Toledo, O., these guys are fastened by the well known Hercules anchors, which are sold by that concern. The company makes sizes suitable for standing all strains in all kinds of ground.



Method of Guying Corner Pole with Hercules Anchors.

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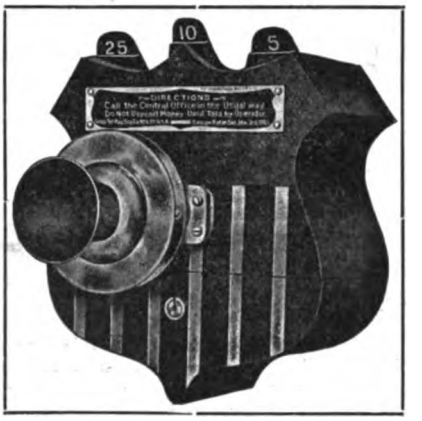
Gray Pay Stations Pay

If you went to buy a gun you wouldn't buy one with a ramrod.
Why buy a pay station with a lever.
With Gray stations you simply drop in the coin.



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FOR SALE, CHEAP—A number of good, second-hand magneto telephones in excellent condition. Ask us about them. Address The Tuscarawas Co. Telephone Co., New Philadelphia, Ohio. 654

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

PURCHASING AGENT large operating company desires change. Five years present position. Excellent record. Energy and ability. Prominent references. Address Box 656, AMERICAN TELEPHONE JOURNAL, New York. 656

DRAUGHTSMEN—Mechanical, electrical, structural, architectural—are at a premium. In a recent issue of "Opportunities," our monthly publication, we listed 104 positions for draughtsmen at salaries of $900-$2,500. Sample copy of "Opportunities" is free for the asking. Hapgoods, 305 Broadway, New York. 464

WANTED—Position by a man acquainted with both theory and practice as Superintendent or Manager. If in need of such a person let me hear. Address Box 664, care THE AMERICAN TELEPHONE JOURNAL, New York. 664

WANTED—One first-class line construction foreman; also four first-class telephone installers and line inspectors. Address Box 659, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 659

RECRUITS DESIRED FOR SIGNAL CORPS, U. S. ARMY—Pay ranges, according to service, home or foreign, from $13 to $90 per month, and in addition rations, quarters, clothing and medical attendance are furnished. The Signal Corps offers unusual opportunities for foreign service and rapid promotion to young men of character, intelligence and ability who have had electrical training. For detailed information write to Chief Signal Officer, U. S. Army, Washington, D. C. 660

TELEPHONE MAN, modern practice all departments, will be open for re-engagement about October 1. Management of progressive Independent properties considered. Address Box 661, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 661

WANTED—Every wire chief to write for our proposition as a side line. No samples, no time lost from regular work, good pay. Address Jester & Millikan, Marion, Ind. 643

TRAVELING position wanted by experienced man capable of looking after a string of exchanges, board, cable trouble and the cable splicing. Best of references. Address Box 663, care THE AMERICAN TELEPHONE JOURNAL, 100 William St., New York City. 663

WANTED—Position as manager or superintendent by a practical telephone man; 12 years' experience in the above positions. Married, 31 years of age. Best of recommendations. Address M., 2119-a Cass avenue, St. Louis, Mo. 658

POSITION AS MANAGER OF TELEPHONE EXCHANGE—Have had five years' experience in telephone business. Three years with large city exchange on switchboard and outside construction work. Two years as manager of exchange of 1,000 subscribers. Thoroughly familiar with up-to-date telephone methods. Can make your exchange pay. Address Box 665, care AMERICAN TELEPHONE JOURNAL, New York. 665

YOUNG MAN with five years' experience in telephone work would like position as traffic manager of a progressive Independent telephone company. Understands both the adjusting and soliciting and also the practical end of the business. Address Box 666, care THE AMERICAN TELEPHONE JOURNAL, New York. 666

WANTED—Practical telephone man desires position as superintendent or trouble shooter on magneto system. Eleven years' experience. Best of references. Iowa or Minnesota preferred. Address Box 667, care THE AMERICAN TELEPHONE JOURNAL, New York City. 667

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SEND FOR OUR FREE BOOKLET AND CATALOGUE ABOUT

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Telephone Systematizing Dept.

THE Edward-Hine Co.

5 and 7 PEARL STREET (EAST) GRAND RAPIDS, MICH. U. S. A.

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THE WEEK'S MESSAGES

NEW COMPANIES.

DUNLAP, ILL.—Articles of incorporation have been filed by the Dunlap & Alta Telephone Company, of Dunlap, Ill. The capital stock is placed at $10,000. Among the incorporators are Walter Alten, W. D. Charles Thresie and Oscar Alten.

MALDEN, ILL.—The Mutual Telephone Company has been organized at Malden, Ill., and will build lines throughout the county.

ROCHESTER, IND.—The Merchants' Mutual Telephone Company, with its principal office in Rochester, has been incorporated. The initial stock is $1,000. It is the intention of the company to build and operate telephone lines and exchange in Fulton County. The directors are Alexander Ruh, Isaac H. Good and Joel R. Townsend.

KNOXVILLE, IA.—The Attica & Columbia Mutual Telephone Company, with its principal place of business at Round Grove school house, Indiana Township, Marion County, Iowa (post office address, Knoxville, Iowa, R. F. D. No. 1), has been incorporated. The intention of the company is to construct and operate telephone lines throughout the county. Its capital stock is $10,000, and the following officers have been elected: W. H. Allen, president; W. C. Coolley, secretary.

HOWARD, KAS.—The Paw Paw Telephone Company, Howard, Kas., has been incorporated with a capital stock of $1,000.

ELKTON, KY.—The Todd County Telephone Company has been organized with headquarters at Elkton, Ky. The company will construct lines throughout the county, establishing exchanges at Elkton, Trenton and Allensville, Ky. Ben Petrie has been named president and W. B. Carvell will manage the business at Allensville.

SPENCER, MASS.—The Farmers' Telephone Company has been organized at Spencer. Among those interested in the new company are Isaac Broxup, J. W. Clark, H. P. Barrett, G. C. Tanski, W. H. Bruce, C. H. Gilbert and O. Gravel.

ONTONAGON, MICH.—A proposition is being considered to form a telephone company in Ontonagon to connect with the lines of the long distance telephone system at Matchwood. Jerome Brown, of Matchwood, is the prime instigator of the movement, and he intends that the complete organization of the company shall be effected at once. More than half the stock has already been subscribed and the movement is receiving the hearty support of the citizens, who will be benefited by such an organization.

CENTER CITY, MINN.—Articles of incorporation have been filed by the Chisago Mutual Telephone Company of Center City. The company has a capital stock of $50,000, and the incorporators are A. B. Slattengren, Charles Andrews, Center City; F. A. Porter, Franconia; Adolph Anderson, Shafer.

CREVE COEUR, MO.—Articles of incorporation have been filed by Creve Coeur Mutual Telephone Company. The capital stock of the company is $1,000 and the board of directors is as follows: Andrew Seeger, Ernest Graeser and John D. Pfister.

JULIAN, NEB.—A new Independent telephone company, to be known as the Farmers' and Merchants' Mutual Telephone Company, of Julian, Neb., has filed articles of incorporation. Messrs. George F. Conlon, James Lockwood, C. L. Mesnet, E. C. Ferguson and H. A. Hauptman are among the directors. The authorized capital stock of the company is $5,000.

FLAXTON, N. D.—The Farmers' & Merchants' Telephone Company, of Flaxton, N. D., with a capital stock of $50,000, has been incorporated. The incorporators of the new company are W. E. Burgett, J. O. Hoolan, L. N. Bottom, Ole Christensen, James K. Smith, L. Haagenson, C. T. Truble, C. C. Sorenson, Ole J. Stompro, Flaxton, N. D.

WOLFORD, N. D.—The Grass Lake Telephone Company has been organized at Wolford, and will construct a telephone system at that place.

GOODNIGHT, OKLA.—Articles of incorporation have been filed by the Goodnight Telephone Company, of Goodnight, Okla. The company is capitalized at $900 and the following are the incorporators: P. Morrison, J. C. McMillan and J. F. Ralston.

GARRETT, OKLA.—The Cimarron Telephone Company, of Kenton and Garrett, with a capital stock of $1,000, has been incorporated. Among the incorporators are Edwin Bookhart and W. T. Hughes, of Benola; Thomas Richmond and Ernest Evans, of Garrett; R. A. Murray and J. E. Shawhan, of Kenton.

HARTSTOWN, PA.—The Fallowfield Telegraph and Telephone Company has been incorporated with a capital stock of $12,000. The company will conduct a general telephone and telegraph business in Crawford County and under its charter it is also privileged to operate police and fire alarm systems. The proposed route of the Fallowfield company's lines is from Hartstown to Adamstown, via McQuiston's Mill; from Hartstown to Atlantic, via Randolph's Corners, and from Hartstown to the lines of North Shenango and Sadsbury townships, with headquarters at Hartstown. George Stratton, of Linesville, has been named as treasurer.

PATCHINSVILLE, PA.—The Clearfield, Cambria and Indiana Telephone Company has been incorporated with a capital stock of $5,000. John H. Patchen, of Patchinsville, is the treasurer. The company is to conduct a general telephone business in the counties named in the title, with principal exchanges at Clearfield, Johnstown and Indiana, the county seats of the respective counties. It is the intention of the company to construct lines also to many of the small towns in these counties.

WESLEY POST OFFICE, PA.—The Venango Telephone Company, with general offices at Wesley Post Office, Venango County, has filed articles of incorporation. The company commences business with a capital stock of $5,000 and is to conduct a general telephone business with exchanges at several places in Venango, Mercer and Butler counties. Connections will be made at Grove City, Mercer County, with the Union Telephone Company. The treasurer of the company is Bert McKee, of Clintonville.

NORTHVILLE, S. D.—Articles of incorporation have been filed by the South Dakota Union Telephone Company, at Northville, with a capital stock of $50,000. The incorporators are Frank C. Mariner, William Broekelheide, W. H. Drisko, W. R. Clark, C. J. Mariner, all of Northville.

HOUSTON, TEXAS.—Incorporation papers have been filed and a charter asked for by the Southern Telegraph and Telephone Company, with a capital stock of $100,000. The headquarters of the new company will be at Houston, the directors of the company being George W. Burkitt, Louis J. Barnes, J. M. Reagan, Edward Kennedy and A. S. Fisher. The company will construct long distance lines throughout the State, with local exchanges at Richmond, Rosenberg, Wharton, Victoria, Yoakum and other places. The lines will run through the following counties: Harris, Galveston, Fort Bend, Wharton, Matagorda, Colorado, Austin, Brazoria, Waller, De Witt, Lavaca, Bee, Victoria, Jackson, Goliad, Gonzales, Nueces, Wilson and Bexar. The line will connect with the lines of the Citizens' Company in San Antonio.

SPRINGFIELD, TENN.—The Springfield Home Telephone Company, of Springfield, Tenn., has been reorganized with H. C. Stratton, Jr., as president, John McMurray, vice-president; A. L. Dorsey, secretary; J. C. Monteith, treasurer. The company has recently completed improvements and extensions, remodeling its plant throughout. The company is now able to get long distance connections north over the lines of the Long Distance Telephone & Telegraph Company.

LA CONNER, WASH.—A new rural telephone line, known as the Beaver Marsh Line, with La Conner as the headquarters, has been organized.

MACFARLAND, DANE CO., WIS.—The People's Telephone Company, of Macfarland, Dane County, Wis., has been incorporated with a capital stock of $5,000. The incorporators are Charles F. Hunter, Hugh R. Henry and Lawrence Larson.

FRANCHISES.

EMERYVILLE, CAL.—The Home Telephone Company has applied for a fifty-year franchise on substantially the same terms as were granted by the Oakland city council.

DANFORTH, ILL.—The Independent Telephone Company, of Kankakee,

NEWS - WANTED

THE matter contained upon the Message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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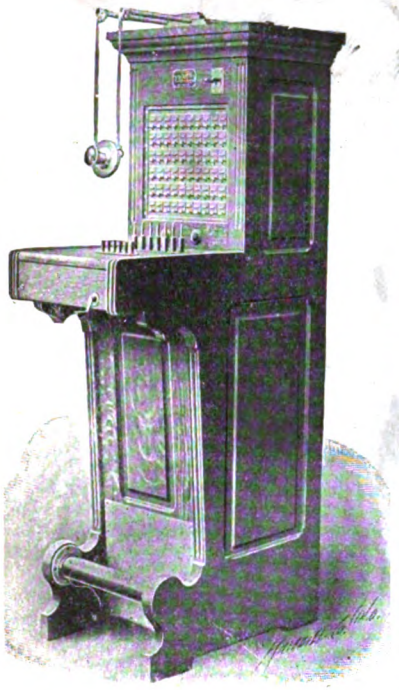
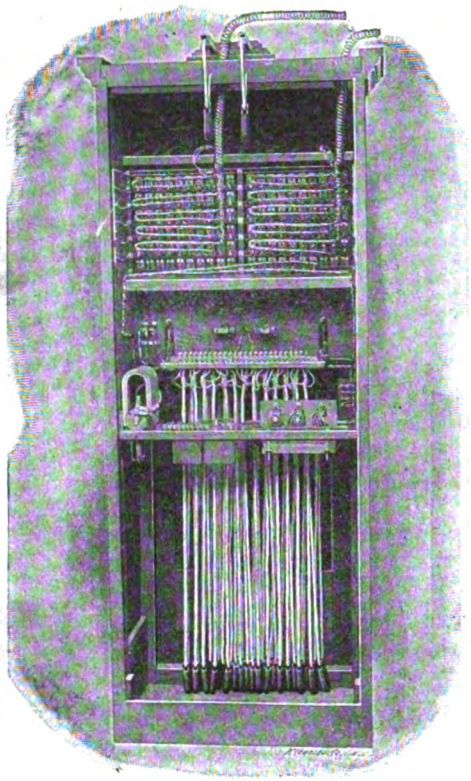
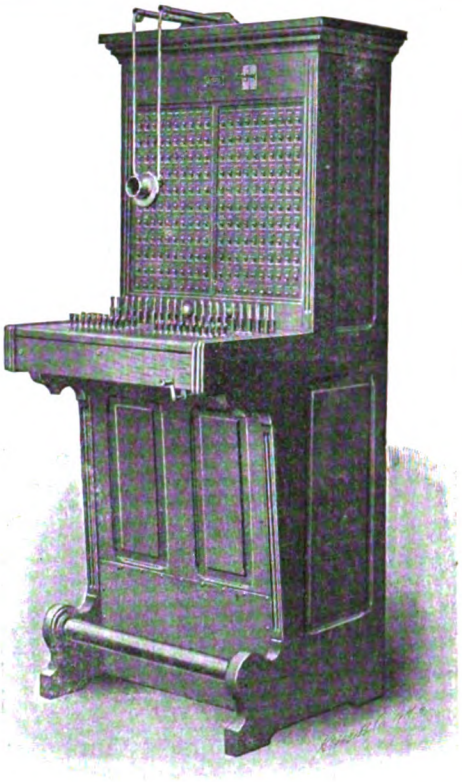
All Sizes

From 10 to 300 lines in one Cabinet

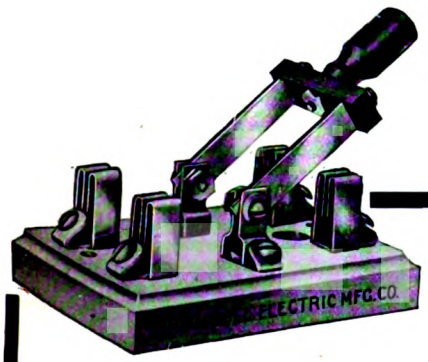






WRITE FOR OUR BULLETINS **GET OUR PRICES**

The Sumter Telephone Mfg. Co. SUMTER, S. C.



All Copper. Made in 4 Styles

To Protect Your Rural Lines

in an efficient and economical manner install

TRUMBULL ALL COPPER SWITCHES

in series with the line at the sub-stations. Then when a thunder storm is imminent the subscribers open the circuits. If the switch is placed between the lightning arrester and the line, many a tedious trip to clear grounds will be obviated and consequently the maintenance charges will be reduced.

Trumbull switches are the only ones which should be used for this purpose, as they possess mechanical and electrical advantages not found in any other type.

Ask for our new catalogue.

TRUMBULL ELECTRIC MFG. CO.

618 Woodford Ave., PLAINVILLE, CONN.

COSTLY ERRORS

An error of one minute in timing a twenty-cent telephone toll message once a day would represent a loss of earned revenue to the company sufficient to cover the maintenance, repairs and interest on the cost of a Calculagraph and set aside in a sinking fund each year a sum sufficient to wipe out the original investment long before the machine is worn out.

In some telephone exchanges where toll messages are timed by means of a clock dial and pencil, hundreds of such errors are made every day.

THE CALCULAGRAPH

prints in minutes and fractions of a minute the exact time a toll line is in use. It eliminates the errors and increases the revenue.

CALCULAGRAPH CO.,

1437 JEWELERS BUILDING **NEW YORK CITY**

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THE WEEK'S MESSAGES

has been granted a telephone franchise at Danforth, and it is the intention of the company to establish an exchange at that point.

MACOMB, ILL.—A petition has been presented for an ordinance for the Farmers' and Merchants' Telephone Company. While an ordinance was granted some time ago the bond was never filed and it is the desire of the company at this time to secure a new ordinance and that the bond of $2,000, signed by T. F. Dudman, B. F. McLean and J. W. Bailey, be approved.

MOLINE, ILL.—The Union Electric Telephone Company has submitted to the city council at Rock Island an amended franchise, and will shortly submit one to the council of Moline. The company desires to have the franchise tax repealed, which has already been done by the Davenport council, in order that it may be free to develop the new territory east of Moline, as well as to improve its system at Rock Island and Davenport. This work, it is estimated, will cost in the neighborhood of $150,000, and cannot be undertaken under the present franchise.

FINANCIAL.

MARION, IND.—The directors of the Citizens' Automatic Telephone Company, Marion, Ind., have been authorized to issue bonds in the sum of $300,000, of which $60,000 is to be retained for future extensions, and the remainder to be sold, and the proceeds used for the construction and installation of the company's new plant in Marion.

LEWISTOWN, MONT.—The capital stock of the Lewistown-Billings Telephone Comapny, of Lewistown, Mont., is to be increased from $20,000 to $50,000.

COMBINATIONS.

REDLANDS, CAL.—At a recent meeting of the Redlands Home Telephone Company the stock was transferred from that company to the Southwestern Company. Officers and directors were elected as follows: President, K. C. Wells; vice-president, J. H. Logie; secretary and treasurer, J. H. Breakenridge.

ELECTIONS.

QUINCY, ILL.—The County Home Telephone Company has elected Charles R. Wheat as general manager and has named the following executive committee: Thomas R. Elliott, F. P. Taylor, J. H. Best and Henry Wiskirchen.

MARION, IND.—The Citizens' Automatic Telephone Company has elected the following officers: President, C. L. Fisher, Chicago; vice-president, E. K. Seymour, Chicago; secretary, Albert E. Wilson, Chicago; treasurer, James S. Sisson, Chicago; manager, O. L. Barger, of Marion; directors, Fred O. Eward, S. L. Strickler and James Sisson, of Marion; H. A. Harris, Albert E. Wilson and E. K. Seymour, of Chicago, and O. L. Barger.

PERSONAL.

C. R. BEEBE, formerly chief inspector of the South Bend, Ind., district of the Central Union Telephone Company, has been appointed manager of the exchange at Logansport, Ind.

F. E. EBERSOLE has recently gone to Portland, Me., to accept the position of general manager of the Northeastern Telephone Company.

R. I. JOHNSON, who has been connected with the Kansas City Home Telephone Company, Kansas City, Mo., has recently severed his connection with that company to accept the position of assistant engineer with the Central Telephone Construction Company.

MISCELLANEOUS.

TRENTON, N. J.—W. H. Hancock recently purchased at Trenton the assets of the Inter-State Telephone Company for $575,000. The assets have been purchased for the Reorganization Committee, consisting of R. I. Wright, of Allentown, Pa.; John Markle, Markle Coal Company, of Jeddo, Pa.; W. S. Hancock, of Trenton; Col. A. C. Bakewell, of New York, and G. N. Rickard, of Wilkes-Barre, Pa. Mr. Hancock states positively that there will be no consolidation with the Bell company, but that the plant will be brought up to date in every particular.

New Construction in the Field

FORT SMITH, ARK.—The Pan Telephone Company, which was recently reorganized with a capital stock of $500,000, is to commence at once the rebuilding and extension of its plant.

BIRMINGHAM, ALA.—The Long Distance Telephone & Telegraph Company of Alabama, with headquarters at Birmingham, has practically completed the construction of its lines between Birmingham, Ala., and Bowling Green, Ky., at which point connection is made with the long distance lines already in operation.

BIRMINGHAM, ALA.—The Home Telephone Company, Birmingham, Ala., has recently constructed lines throughout Walker County, thus connecting up several farmer lines, making connection at Bessemer, which was the terminal of its line in this direction before the completion of the present extensions. Other extensions will be made in the future.

MOBILE, ALA.—Among the improvements and extensions recently completed by the Mobile Home Telephone Company, capitalized at $350,000, may be mentioned the erection of a new exchange near the business section of the city; the installation of a very elaborate conduit system, and the placing of a new, modern type, thoroughly up-to-date switchboard in its exchange. Submarine cable has also been laid by the company across Mobile Bay into Baldwin County, where a small exchange has been established, thereby covering the county with Independent lines. Everything possible has been done by the company to make its plant one of the best equipped Independent plants in the South.

HOTCHKISS, COLO.—The Co-operative Telephone Company is extending its lines in Hotchkiss.

WEISER, IDAHO.—Work has been commenced on the construction of the line to be built by D. B. Hartley from Weiser to the Mann Creek Section. The line is to be known as the Hartley Mutual Telephone Company, and will extend to the Thousand Springs Valley and Midvale, operating in connection with the Independent company.

WEISER, IDAHO.—It is the intention of the Weiser Independent Telephone Company to build a new exchange building at Weiser.

ATLANTA, ILL.—The Farmers' Telephone Company, east of Atlanta, has made connections with the Eminence telephone lines.

QUINCY, ILL.—The County Home Telephone Company plans the extension of its lines throughout Adams County.

RED OAK, IA.—A new toll line has been built by the Montgomery County Telephone Company from Red Oak to Elliott.

PADUCAH, KY.—The Home Telephone Company, which is spending $160,000 in improvements in the city of Paducah, will spend $400,000 in western Kentucky. The improvements include both the service at the exchanges and extensive outside additions and changes.

FOXCROFT, ME.—The Farmers' Telephone Company, which has lately installed a new switchboard to take care of its increased business will build a line from Foxcroft toward Sebec.

HOULTON, ME.—The Independent Telephone Company, which has been in operation in Houlton for about a year, is building a number of new lines and eventually its service will extend over the entire Aroostook County.

SAINT CLAIR, MINN.—The St. Clair Independent Telephone Company is installing an exchange at Saint Clair. The lines of the company will connect with Mankato through the Citizens' Company, and with Janesville by the Cannon Valley. Connections will also be made with other rural lines.

ABBEVILLE, MISS.—Connections between the exchanges at Coldwater and Abbeville have been completed by the Rural Telephone Company. The lines extend through three counties, Lafayette, Marshall and Tate, for a distance of over sixty miles, and give connection to the inland towns of Blackwater, Harmontown, Teckville, Tyro, Looxahoma and Independence.

MISSOULA, MONT.—The Independent Telephone Company of Butte, represented by H. A. Galway, of Butte, and Mr. Brown, of Salt Lake City, are interesting the citizens of Missoula in the construction of an Independent plant at that point. It is the intention of the company, which has connections with Anaconda, Great Falls and other points in the central part of the State and which will shortly make connections with Billings and other Eastern Montana points, to install a branch of its system in the Missoula and Bitter Root valleys. It is also the intention of the company to apply for franchises at Stevensville and Hamilton.

LEBANON, N. J.—The Lebanon Telephone Company is planning to extend its lines to Woodglen and Glen Gardner.

EAGLE MILLS, N. Y.—The lines of the Rensselaer Telephone Company are being extended at Eagle Mills.

BREESPORT, N. Y.—The Breesport Telephone Company, recently incorporated with a capital stock of $2,100, will build lines to Horseheads, Erin, Veteran, Elmira and Baldwin. The company has been granted a franchise for one hundred years.

LEETONIA, O.—The Youngstown & Ohio River Railroad Company expects to place telephones at its grading camps and offices throughout the county. The telephones will be located at points between Leetonia and West Point.

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VOLUME XIV. SATURDAY, SEPTEMBER 1, 1906. NUMBER 9

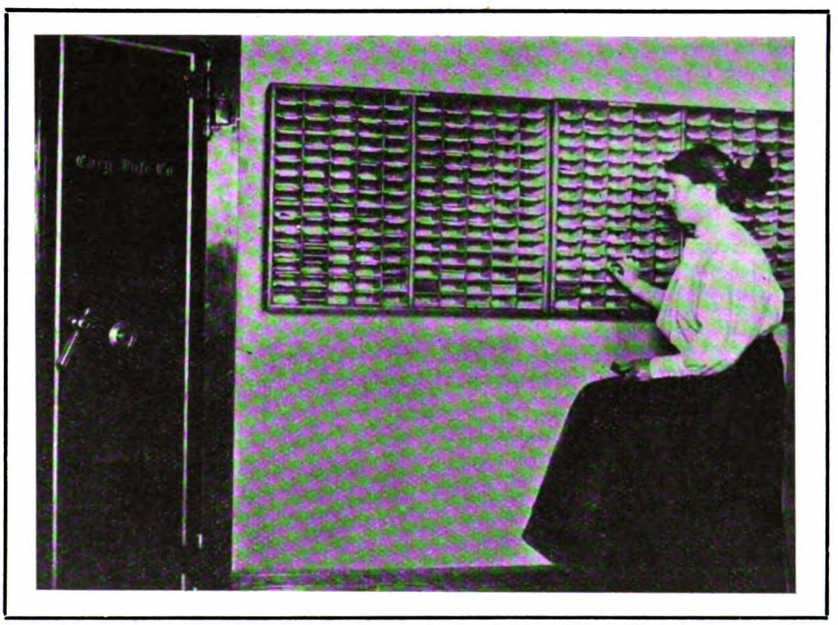
Niagara Falls, the Up-to-Date Telephone Exchange

ARTICLE I.—SYSTEM IN EXCHANGE MANAGEMENT, CONTINUED.

By R. M. Eaton.

FROM the signing of the contract by the subscriber until the concluding step which puts his instrument in service the various processes carried on by the force at the Niagara Falls exchange were traced in the first portion of this article. So rapidly has the number of subscribers increased since the original installation of modern equipment in the present building that the work of handling new installations in the manner described has formed an important part of the routine. The same principles which have made the handling of a large amount of this business so easy are applied to other divisions of exchange work with equally good results.

Disconnections and removals are handled in accordance with a copy of typewritten instructions which is permanently retained by the clerical department. If a subscriber informs the office that he wishes to have his telephone removed and the disconnection is desired on account of his intention to go out of business or remove from the city, disconnection orders are made out without question or delay by the clerk. If any other reason for the desire to discontinue service is given, the cards are made out, the reason for disconnection being stated upon them, and forwarded to the general manager for approval. The request is investigated and the action to be taken on the subscriber's request is determined by the result of the investigation. The subscriber is then informed by letter of the nature of the disposition the company will make of his wish to violate the terms of his contract. Sometimes subscribers have some slight trouble and during the heat of their exasperation call up and order their "Telephone removed at once." Cases of this kind are ignored other than to investigate the trouble and remedy it. In 99 cases out of every 100 of this nature the subscriber has no more idea of having his telephone removed than he has of flying. All telephone men of experience are familiar with cases of this kind and know how to handle them.



One of the Time and Labor Saving Features is the Cabinet Where Toll Tickets are Filed According to Line and Call Numbers. This Cabinet is at the Right of the Door Leading to the Fireproof Vault.

Disconnection cards, on the form shown in the illustration, are issued in duplicate and sent from the clerical department to the wire chief. In accordance with his written instructions he issues one card to an installer who is to do the necessary work, and retains the duplicate. When the instrument has been removed the installer notifies the wire chief, who removes the card from his card file, placing a blank one in its place, writes time and date on the disconnection card and forwards it to the chief operator. She removes the card from her card record, placing a blank one in its place, draws a red line through the name in the interleaved directory, marks the date of disconnection at the end of the line, places a red designation plug in the jacks in the multiple, which is to show operators receiving calls for that number that it has been disconnected, and, after signing the disconnection card sends it back to the clerical department. Disconnected call numbers are not used again until after the issue of the next succeeding directory. In the course of the day the installer drops into the basket by the wicket between the instrument room and the clerical office the card which he has taken to the station. Both cards are brought together and checked. If on checking they are both found to be properly made out, one is placed in a disconnection file and the duplicate is given to the secretary from which the ledger records are made out and corrected.

Disconnections have occasionally been made on the original motion of the company on account of persons being addicted to the faults which cause them to be known as "Dead beats," "Poor pays," "Continual movers," "Contract violators," "Assumed names," etc. If this is the case, the secretary stamps the word "Blacklisted" across the face of the card he has received, writes on the back the information covering the case and files in a blacklist record for future reference.

Removals of telephones to a new address are handled by a routine made up from a combination of that applying to disconnections and original installations. The disconnection cards are made out with the words "Change of address" stamped across the face. Installation cards bearing the same stamp are issued with them, accompanied by the usual "drop order" slips. Work is handled in the regular manner, and the cards pass through the regular channels, records being made by the proper persons in the manner which has been described.

When an order covers a change of name only, disconnection

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and installation orders are issued but not in duplicate, stamped across the face "Change of name only," also "For record only." In this case the wire chief makes his necessary record, forwards to the chief operator for her record and she returns it to the clerical department.

The toll tickets used are the regular manifold duplicate ticket and are sent each day from the different offices included in the system of the company to the main office at Niagara Falls so that each morning the clerks have before them the tickets representing all toll business for the previous day. The original of each ticket is filed in a cabinet provided for this purpose. This cabinet is provided with divisions corresponding to each exchange where toll tickets are made out. In the illustration it will be noted that the Niagara Falls division, at the left, has 10 sets of 15 pigeon holes, while Lockport and Tonawanda have each five sets. Each pigeon hole is used for ten subscribers lines; as an illustration the first, 1 to 10, the second, 11 to 20, and so on. The tickets are filed here according to call number and the duplicates are used for making entries in the daily ledger. After the toll daily ledger sheet has been made out the duplicates are filed in packages according to date. These may be retained not longer than three months. Each month a toll traffic sheet, showing the classified toll business, is made out from the toll ledger sheets.

Operators at the Door of the Niagara Falls Exchange.

The method of handling the billing and collecting has been marked out on new lines which permit this work to be handled with a minimum amount of effort on the part of all employees. Bill forms are printed across one face of an envelope which is perforated across one end as may be seen from the illustration. During the month all bills have all the blanks above the double line filled in, and the amount due for the regular rental for that month is also written in. They are then arranged alphabetically, in the same way that the names of subscribers appear upon the ledger account, and held until the end of the month. On the last day of the month the secretary receives from collectors their final reports. After these have been entered in the ledger he takes up the bills and writes in the amount overdue, copying it rapidly from his ledger as he turns over its pages and runs through the bills. It takes but a short time for him to enter in the ledger such amounts as are overdue, and as soon as he has completed his work the bills are ready for the addition of the amount of tolls.

In order to expedite this work the bills are rearranged in order of call numbers. In the meantime the toll tickets have been taken from the file on the wall at the right of the fireproof vault, and from their method of filing these are arranged according to line and call numbers. The clerk then has before her the two sets of forms arranged according to the same plan, and all she has to do is to run through them simultaneously, transferring to the bills of each person who has used the toll lines the total of the amounts shown on his tickets. As this is done the tickets themselves are slipped into the envelope. This makes the handling of the work extremely simple and economical and nothing short of carelessness can introduce an error. If by any chance an error should be introduced, the subscriber has all necessary information for detecting it the moment he receives his bill, for he has the original toll tickets. Then, too, it will be seen that if he calls up the office and makes an inquiry about the account all information is kept where it can be obtained in an instant, and any necessary explanation can be immediately made over the wire. After the bills have been prepared they are ready for the collectors. As the toll tickets are sorted the last night of the month, and the toll tickets up to midnight of that day inserted in the following morning, all bills are ready to go to subscribers promptly on the first day of the month. As each collector has her (bright, good-looking girls are used as collectors) work assigned according to districts, the bills are divided, all those for a single district being placed together. The cabinet at the left of the wicket opening into the inspector's room shown in the illustration presented with the previous portion of this article, has its upper portion divided into compartments, each one of which is assigned to a certain collection district, the number of which appears upon a label at the bottom of the pigeon hole. The collectors, after dividing the bills into the required groups, simply put them into the pigeon holes where they should go. The collectors take out the bills, leave the larger portion of the envelope containing the toll tickets with the subscriber and hold the detached left hand end. If the bill is paid, the collector stamps "paid," dates and initials it, and marks 'paid" and the date on the stub which she retains.

Disconnection Order. No.....

Exchange..... Call No.....
Name.....
Address.....
Style Service.....
Style Instrument..... No..... Meter No.....
Cable..... Pair..... Box.....
Issued by..... Date.....
Disconnected..... a. m. p. m. Date.....
Note.....
Disconnected by.....
O. K. ..... W. C..... C. O.

Installer must fill out necessary information and return card to office when work is finished.—No disconnection allowed without card.

Form for Disconnection Order Used by the Niagara County Home Telephone Company.

The stubs corresponding to all paid bills are turned in at night to the cashier with collections, and the properly filled daily collection sheet, of which the collector retains a carbon copy. The cashier checks the receipts, stubs and collection sheet, and when everything is as it should be issues to the collector a receipt for the amount she turns in. As the collection districts are laid out

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by the map so that each should contain the number of subscribers which a collector should cover in one day, the number of bills contained in one pigeon hole should have been delivered by night.

In a city like Niagara Falls where practically the ideal telephone condition has been reached, inasmuch as even the laboring man enjoys the advantages of having a telephone in his humble home, the system of immediate payment on demand cannot be reached. The railroad man has to wait for his monthly check, the mill worker for his weekly envelope. These conditions result in a promise to the collector of payment on a certain day. This date is noted on the back of the stub. On the return to the office it is deposited in a special "future date compartment," one of which is provided for each day of the month in the same cabinet with, and below the compartments for regular districts. This serves as a practical follow-up file. For instance, it will be noted that if a collector has eight districts he would get around to the last one on the eighth day of the month. By this time he will doubtless have in the eighth "future date compartment" a few stubs and these he will take out with the bills for the eighth regular district.

Whatever delinquencies arise are handled by the secretary in accordance with a prescribed form. After an account has remained unpaid for thirty days the following letter is sent:

Dear Sir: We note your account for telephone service is somewhat overdue.

We would consider it a favor indeed if you could see your way clear to make settlement of this account.

We appreciate past courtesies, and trust that we will receive further favors from you. Sincerely yours,

An account which is sixty days overdue calls for a second reminder, which is worded as follows:

HOME 'PHONE
THIS TELEPHONE IS
No.
USE THE "HOME" EVERY TIME, IT'S THE BEST
The following list are the stations we most frequently call:
No.
NAME
No.
NAME
BUFFALO—10 CENTS
CALL FOR NUMBER ONLY AND TALK ONE MINUTE
Get the habit of using the "HOME" to Buffalo. You will find it the Quickest and Clearest.

This Card is Supplied as a Convenience to the Subscribers and Serves as a Constant Reminder that the Home Lines Furnish the Best Service.

Dear Sir: We note your account for telephone service is considerably overdue.

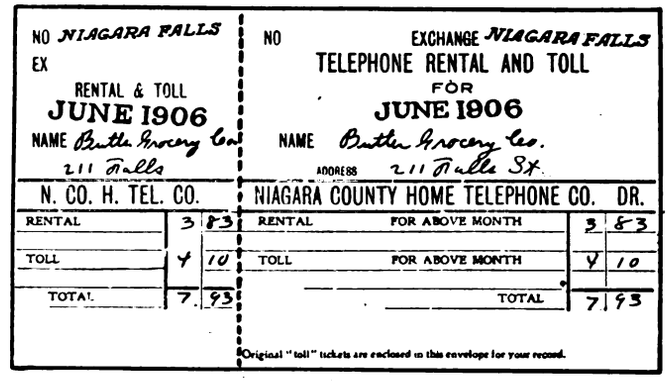
Following the regular rules of this company in matters of this kind, we will have to disconnect your service on (allow five days) if the account is not taken care of previous to that time.

Trusting that you now see your way clear to take this matter up, we remain, Sincerely yours,

If at the end of five days from writing of the last letter the account is not settled, orders are issued from the secretary's office to the wire chief, to disconnect at the frame the telephone in question.

If at the expiration of five days more the account is not taken up, the telephone will be completely disconnected and taken out, and the following letter sent to the subscriber:

Dear Sir: We regret exceedingly that the rules of this company have compelled us to discontinue your service for non-payment of rental.


NO NIAGARA FALLS EX
RENTAL & TOLL
JUNE 1906
NAME Butler Grocery Co
211 Falls

NO EXCHANGE NIAGARA FALLS
TELEPHONE RENTAL AND TOLL FOR JUNE 1906
NAME Butler Grocery Co.
ADDRESS 211 Falls St.

N. CO. H. TEL. CO.			NIAGARA COUNTY HOME TELEPHONE CO. DR.		
RENTAL	3	83	RENTAL FOR ABOVE MONTH	3	83
TOLL	4	10	TOLL FOR ABOVE MONTH	4	10
TOTAL	7	93	TOTAL	7	93

Original "toll" tickets are enclosed in this envelope for your record.

This Bill is Made Out On the Face of an Envelope. The Stub is, if Necessary, Retained by the Collector as a Follow-up "Tickler"

If settlement is not made by ....day, this account will be placed in the hands of our attorneys, and suit will be commenced for collection.

We regret exceedingly that we have to resort to these extreme measures, and trust that you will look upon it in the business manner that it really exists, and not as a personal matter. Yours truly,

Directories are issued every quarter. The new matter is sent to the printer for setting up, so that he may have sufficient time to get the work done in advance. This new matter is set up in linotype slugs, and classified among the regular standing matter in galley form.

On the first day of the month that the book is to be issued, the last matter and disconnections are given to the printer. He immediately sets this matter up, classifies it, takes out the disconnections, locks up the matter in pages and delivers the book as quickly as possible. Previous to the delivery of the book, wrappers are all addressed and stamped so that the books may be mailed to each subscriber the day they are received from the printer.

CANADIANS CONDEMN PRETEXTS USED BY BELL COMPANY.

THE Union of Canadian Municipalities, at its recent meeting at Halifax, N. S., adopted the following resolution: "In the opinion of the Union of Canadian Municipalities, where a telephone company already charges its maximum authorized rate to the subscribers, being under the obligation of supplying the best and most modern equipment, it is unjust and illegal for the company to make an additional charge, under the pretense of supplying an improved instrument, called a long distance telephone." A resolution was adopted endorsing the request of the provincial legislature of Manitoba to the parliament of Canada, for authority to expropriate or purchase all the telephone lines in the province, and affirming the principle that similar authority should be given to the other provinces of the dominion. It was also unanimously decided to memorialize parliament to amend the legislation of last session so as to require the freest interchange of business between telephone companies, whether long distance or not. It was held that the recent legislation requiring the long distance lines to give connection to local and rival concerns did not meet the public requirements, and that in the interchange of business telephone companies should be placed in precisely the same category as railway companies.

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MUTUAL COMPANIES OF BLACK HAWK COUNTY, IOWA, ORGANIZE.

REPRESENTATIVES of about twenty Independent mutual telephone companies, operating in Black Hawk County, Ia., held a meeting at which they organized an association for the purpose of effecting an improvement in their common business and the promotion of the mutual interests of the several companies. The companies will now work as a unit in many business matters and will enlarge the scope of the usefulness of the mutual telephone and rural telephone lines.

The following officers were elected for the newly organized association: President, E. W. Hardon, Jesup; vice-president, William Crownover, Hudson; secretary and treasurer, Fred Decker, Janesville; corresponding secretary, G. A. Evenson.

The association also passed resolutions commending the efficient work of State Agent C. A. Hollis.

long distance service in order to reach a larger territory and more effectively compete with the Bell system.

The purposes of the association are the interchange of busi-

OFFICIAL BULLETIN NUMBER TWO OF THE INTERNATIONAL INDEPENDENT TELEPHONE ASSOCIATION OF AMERICA.

(SECOND SERIES.)

HEADQUARTERS.

The general offices have been moved from rooms formerly occupied to No. 422-23 Electric Building, Cleveland, Ohio. Independent people visiting Cleveland will always be welcome.

COMMITTEES.

The following are the committees appointed by the President:

Executive Committee.—Senator C. W. Kline, Hazelton, Pa.; Frank L. Beam, Columbus, O.; A. C. Lindemuth, Richmond, Ind.; M. B. Overly, Louisville, Ky.

The constitution provides that the President shall be an ex-officio member and chairman of this Committee.

Committee on Litigation and Legislation.—Chairman, J. B. Earle, Waco, Tex.; F. H. Woods, Lincoln, Neb.; E. R. Conklin, Aurora, Ill.; E. B. Fisher, Grand Rapids, Mich.; Richard Valentine, Janesville, Wis.

Amendments to the constitution, adopted at the last Convention, reducing the size of the Executive Committee, contemplated making this a very active body, assigning to it detailed work formerly handled by a separate committee. This has been kept in view in selecting the committee. All of the members are within easy traveling distance of headquarters, so that meetings can be called on short notice whenever necessary, and attended with as little loss of time to the members as possible. As provided by the constitution, all of the members are Presidents of their various State Associations.

In appointing the Committee on Litigation and Legislation, care has been taken to select members from States not already represented among the officers or Executive Committee, and to have the membership as widely distributed as possible, so as to make it a representative committee, it being the object to have this committee, in addition to its special duties, act in conjunction with the officers and Executive Committee in perfecting the organization in various parts of the country and carrying on the general work of the Association.

CONVENTION REPORT.

The Official Report of Proceedings is in the hands of the printer and will be ready for distribution at an early date.

MEETINGS AND NEW ORGANIZATIONS.

The good effect of the last convention is noticeable in the increased interest being taken in organization all over the country. The Independent Telephone Association of North Carolina and The Maine Independent Telephone Association have been organized within the last month. Both States will affiliate with the International Association. On behalf of all our members we extend to these new organizations a hearty welcome and best wishes for their success.

Other organizations are nearly completed and splendid district and State meetings are being held by the various associations, all of them being well attended. The Canadian Association will hold its annual meeting at Toronto on September 5th. It extends a cordial invitation to its associates in the United States to attend this meeting and assures a profitable time to all who accept.

THE CHICAGO SITUATION.

The committee appointed to investigate the Chicago situation hopes to have a complete report ready before the next Bulletin.

SPECIAL.

All Independent companies are requested to put the Association on their mailing list for any special advertising matter which they distribute. We wish to keep in touch with what is being done by the aggressive Independent companies.

STATISTICAL AND MAP DEPARTMENT.

The Association is compiling, in a concise manner, for distribution, the most complete telephone statistics obtainable. All Associations which may have late data not previously furnished us are asked kindly to forward same as soon as possible. Companies in states having no association are requested to forward information regarding their properties directly to this office. We should also like to hear from individuals who may have data which they think would be of service to us.

There are a number of the new Ohio maps left after the filling of subscription orders, and we will dispose of them at regular subscription rates.

The Independent companies are not responding as they should to our requests for map data. This is to be regretted. Success in preparing these maps depends upon your co-operation. Maps equal in every way to the one for Ohio can be prepared for your State, if you will only furnish us complete data. Won't you see that your company sends us a sketch of toll lines operated?

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Independent Telephone Development in New York

SUBSCRIBERS to the hundreds of rural lines in the western part of New York now receive connections with one another and with all important towns over a most comprehensive system of Independent lines, as shown on the accompanying map. The Consolidated Telephone Company of Buffalo is responsible for the development of a very large portion of the important territory in the state. This organization, of which B. G. Hubbell is the president, includes in its directorate many of the most prominent and influential men in the state, and the character of the board is reflected in the high grade construction and service of the company's exchanges. The cities and towns in which are operated central offices controlled by this organization, are: Arcade, N. Y., Attica, Athol Springs, Avon, Alden, Akron, Athens, Pa., Bath, N. Y., Belmont, Blasdell, Bolivar, Buffalo, Canisteo, Charlotte, Cohocton, Corning, Corfu, Cortland, Clifton Springs, Caledonia, Cherry Creek, Dansville, Despatch, Elma, E. Aurora, Franklinville, Fairport, Friendship, Forestville, Geneva, Geneseo, Gowanda, Hamburg, Holley, Hornell, Honeoye Falls, Ithaca, Lancaster, LeRoy, Livonia, Lima, Little Valley, Marilla, Mt. Morris, Moscow, North Collins, Orchard Park, Phelps, Penn Yan, Pike, Pitsford, Perry, Rush, Rushford, Salamanca, Sayre, Pa., Shinglehouse, Pa., South Dayton, N. Y., Silver Creek, Springville, Trumbulls Corners, Wayland, Watkins, Waverly, Wellsville, Williamsville, and others are being rapidly added to the list. In addition to the local lines entering these exchanges they are connected together by the long distance lines of the Inter-Ocean Telephone and Telegraph Company. The system of the Consolidated company in New York includes about 1,500 miles of pole line, with not far from 25,000 miles of wire, most of which is No. 10 copper. These lines connect with over 800 stations in New York state, with about 90,000 subscribers in the district shown on this map, west of Syracuse and Binghamton.

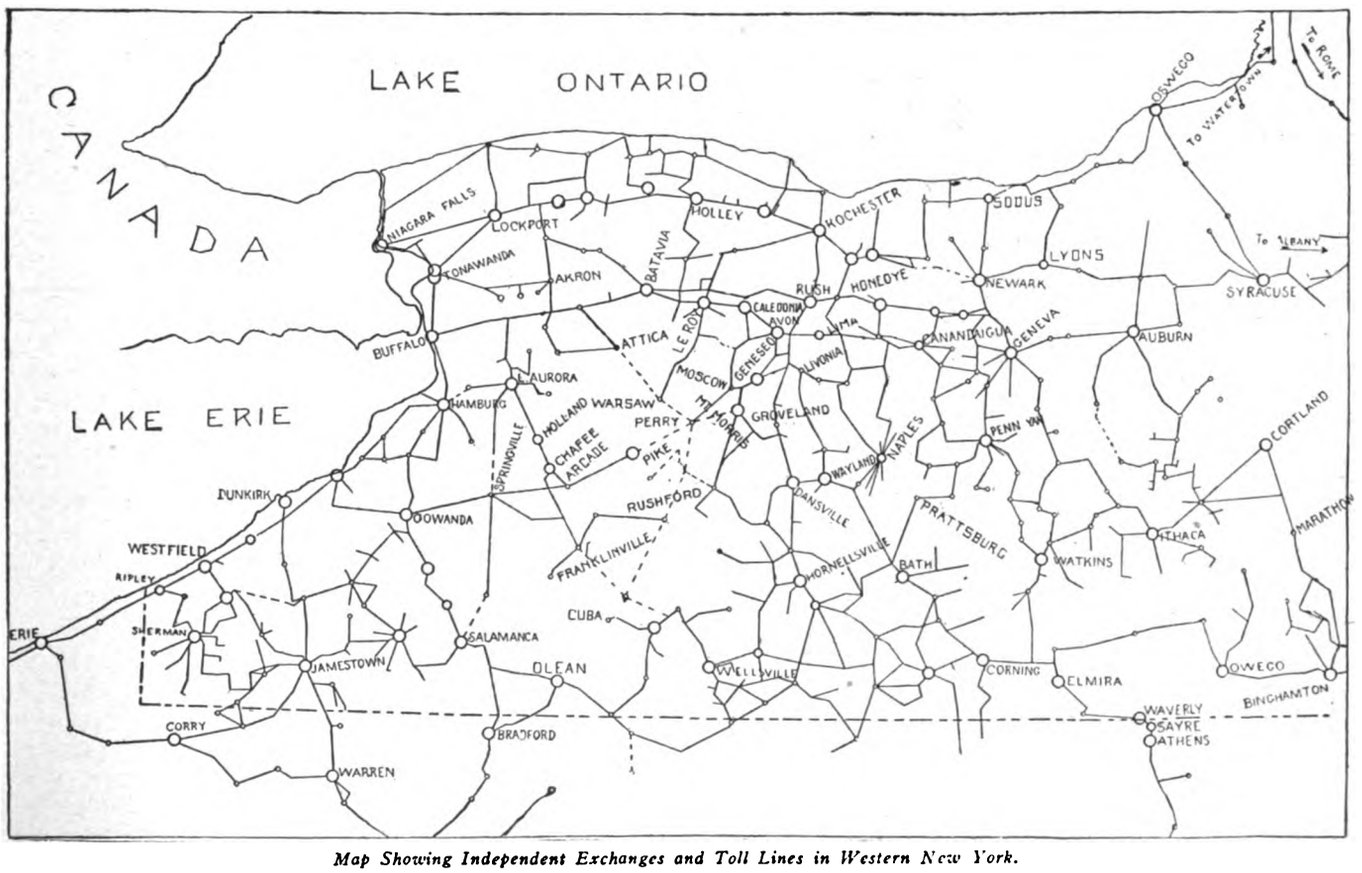
The Inter-Ocean lines reach, commercially, 549 stations in Pennsylvania and 573 stations in Ohio.

Farther east in the state most excellent facilities are furnished by the companies subsidiary to the United States Independent Telephone Company, which owns a large portion of the stock of the Rochester Telephone Company of Rochester and the New York Independent Telephone Company of New York City, as well as of the Stromberg-Carlson Telephone Manufacturing Company.

The Rochester Telephone Company, aside from the Rochester exchange, owns or controls, and operates the following exchanges: Interlake Telephone Company, Canandaigua, N. Y.; Brockport Telephone Company, Brockport, N. Y.; Bergen Telephone Company, Bergen, N. Y.

The Rochester Telephone Company also has a controlling interest in the Independent Telephone Securities Company, of Rochester, N. Y., which owns, or has a controlling interest in, and operates exchanges held by the following telephone companies: Utica Home Telephone Company, Utica; County Telephone Company, Herkimer; Rome Home Telephone Company, Rome; Clinton Home Telephone Company, Clinton; Otsego Home Telephone Company, Cooperstown; Black River Telephone Company, Lowville; Independent Telephone Company, Syracuse; Weedsport Telephone Company, Weedsport; Lake-Side Telephone Company, Lyndonville; Little Valley Telephone Company, Little Valley; Pioneer Telephone Company, Cattaraugus; Home Telephone Company, Ellicottville; Home Telephone Company, Jamestown. Service is furnished by these companies to large numbers of well satisfied subscribers in each of the following cities and towns: Utica, Whitesboro, Hartford, Herkimer, Mohawk, Ilion, Frankfort, Newport, Rome, Vernon, Clinton, Clark's Mills, Westmoreland, Paris Hill, Kirkland, Cooperstown, Richfield Springs, Hartwick, Morris, Edmeston, Adams, Pulaski, Burrs Mills, Boonville, Deer River, Lacona, Lowville, Lyons Falls, Sacketts Harbor, Trenton, West Leyden, Black River, Copenhagen, Syracuse, Camillus, Chittenango, Fayettesville, Liverpool, East Syracuse, Tully, Weedsport, Elbridge, Jordan.

In addition to these systems a number of important exchanges are controlled by the Rawson syndicate, of Elyria, Ohio, and



Map Showing Independent Exchanges and Toll Lines in Western New York.

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these are growing rapidly. Scattered through the state are exchanges owned by different Home telephone companies which have become very firmly established. The success of some of these companies, and notably of the one which so thoroughly covers Niagara County, is remarkable. The Albany Home Telephone Company is rapidly building up and extending its system in the capital of the state, and good work is being done by the companies in Troy, Amsterdam, Hoosick Falls and other important places. Although the lack of toll line facilities is felt by some of these companies they are well supported.

Some Features of All-Cable Distribution

DEFINING all-cable distribution in an article recently contributed to the *Cumberland Telephone Journal*, a paper circulated among the employees of the Cumberland Telephone Company, E. D. Reynolds states that when a plant is distributed by cable from the exchange to a point very near the sub-station, and from the nearest terminal head the sub-station loop is carried to its terminus by means of a twisted pair rubber covered wire, and only a minimum of open or iron wire is used in an entire plant, we may regard this as being an all-cable plant. This applies also to an entire underground proposition.

Mr. Reynolds has carried on some investigations which led him to present some very interesting views on cable distribution, from which is abstracted the following digest:

The rapid growth of the number of telephone subscribers and the attendant multiplicity of wires calls for a large increase in cables. A very large increase in cables calls for a larger increase in terminal heads.

A larger number of terminal heads means, except in the most congested districts, smaller units to the head; and finally the larger amount of tapping necessary demands a cheaper method of tapping. These points follow each other in logical order and cannot be gotten away from. They will be discussed separately. To begin with an all-cable distribution is desirable from its many advantages over the open wire system. The maintenance charges are reduced very much and saving is made along other lines. It eliminates a large amount of heavy overhead work, permits the use of much smaller poles, cuts down the trouble force and makes it possible for a company to dispense with line order crews almost altogether. It does away with sleet liability, reduces troubles and eliminates the troubles caused to subscribers by line order crews and the constant cutting of changes, and should also reduce the force in the terminal room of large exchanges.

The use of an all-cable distribution, of course, calls for increased terminal points. These should be in small units. This is conclusive, for if large units are used it is necessary either to waste terminal facilities or use long runs of rubber-covered wire in order to reach enough subscribers to give the terminal its load, or to use open leads, with protected boxes, etc., and to assume all the burden and liability of open distribution, and that is what it is desirable to try to get away from. The long runs of rubber wire are expensive and there is certainly no economy in large terminal heads, carrying a few subscribers, so the proposition indicates, on its face, small terminals and plenty of them. This leads directly to the assumption that in order to have plenty of terminals both the terminal apparatus and the method of tapping should be cheapened. This feature will be taken up later on in this paper. Just here it is proper to bring up the subject of multipleing cable. It is not going too far to say that multiples in cable work are a necessary nuisance, and like some powerful medicines are to be taken in small and broken doses. Mr. Reynolds states that he does not think that cable wires multipled in large units, or extending over large areas of territory, are as desirable as close acquaintances, as some would have us believe. Simplicity—as far as is consistent—will cover a multitude of sins, and under the new plan outlined in this article companies will gain in simplicity and ease of handling somewhat of the advantages claimed in other and more cumbersome methods of multipleing. With these points firmly fixed in his mind he suggested a system that is a combination of direct and multiple work, in small units, fully exploited in the accompanying specifications. Reference to these specifications will show that they describe some radical departures from the accepted methods, namely the use of very small units, and the method of tapping feeder cables. Needless to say, this departure has provoked much adverse criticism and doubt as to the feasibility of the measure indicated. The scoffer and the "doubting Thomas" like the poor, are always in evidence. Although the things outlined in the specifications have not yet been done, it is believed that they can be accomplished in a commercially practicable manner. The designer believes it possible to tap cables for from 1 to 10 pairs as may be needed, and that it can be done after the method set forth in these specifications. After all; it is but a question of workmanship. From a number of experiments made in the laboratory it was shown that by making the proper slit in a cable, it is possible to reach any wire desired, make connections, treat fully in all the various steps of splicing, and close the cable again without the aid of the time-honored split sleeve and wiped joints. Obviously the smaller the taps the easier this is to do. One might even venture the assertion that in a short time the telephone engineers of the country, together with the cable manufacturers, will devise a self-tapping cable, that is, a cable with accessible tapping points at specified intervals aided by color schemes, or branched assignments in the cables, and tapping cables will be brought to the same state of simplicity that is involved in tapping water or gas pipes. This may seem visionary, but Mr. Reynolds is very firm in his belief that the ideas advocated above will in the very near future be fully exploited along the lines suggested.

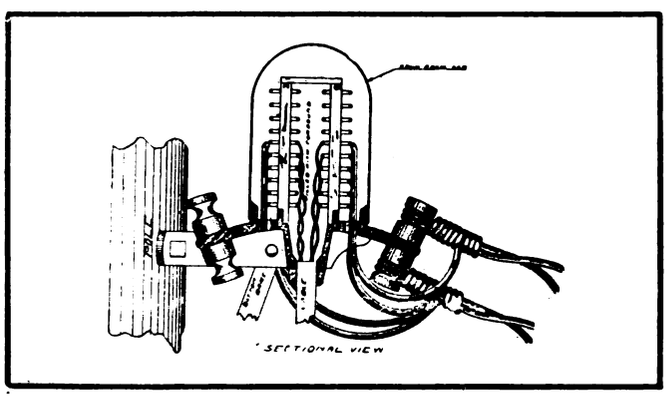

Fig. 1. Sketch of new terminal head suggested by E. D. Reynolds.

Briefly outlined, the proposed plan is to graft small taps into the parent cables by means of suitable openings in the sheath, the end of the tap being split, spread out and used as a shield or a separate shield inserted, to accommodate the increase in bulk of the conductors due to the added wires and connections of the tap. The terminal head submitted in connection with this plan will be found to possess some new features; it is very small and compact. It is a combination of pothead, cover, and insulators assembled in one fixture. When this terminal ring is placed on the pole and the tap made, the installation is complete in itself. There are no rubber pothead wires. The paper core cable terminates on punchings or binding screws in such shape that the end of the cable can be sealed as in ordinary practice with compound. The connection from these points to the sub-station may then be made without any other connection in the circuit. This terminal head complete is produced at a satisfactory figure in cost. It seems to be an accepted fact that the initial cost of an all-cable system is greater than the open wire.

(To be continued.)

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QUERIES

USE OF INSULATED IRON WIRE ON LINES.—(757.)

We have a trunk line run between two towns several miles apart which for a considerable distance goes through trees. We are unable to get the privilege to trim properly, and the result is that our line gives very poor service. Would any harmful effects be produced by the use of rubber covered iron wire, such as we use for house drops? J. C.

If the distance through the trees is not along a route taken by your regular cables, or if it is too great to permit of the use of cable on account of the detrimental effect upon transmission the only remedy available seems to be the use of covered wire. Of course iron will cost you less than copper, so you will probably give it the preference for this reason.

It would be unwise, however, to use too great a length of twisted paired iron wire, with rubber insulation, on account of the high capacity existing between the wires of such a pair. This would surely cause transmission to be muffled and indistinct. The better scheme would be to use single rubber covered wire, run on the same pins used for your present bare wire line. This will get rid of your tree grounds without introducing any other complications.

AUTOMATIC BUSY TEST ON RELAY SWITCHBOARD.—(758.)

I have heard of relay switchboards having an "automatic" busy test, but do not know what the term means. Can you explain it to me? P. G.

The term is applied to the form of busy test used on trunk circuits by the Bell companies. In these circuits the operator has no means of listening on the cord circuit, yet it is necessary

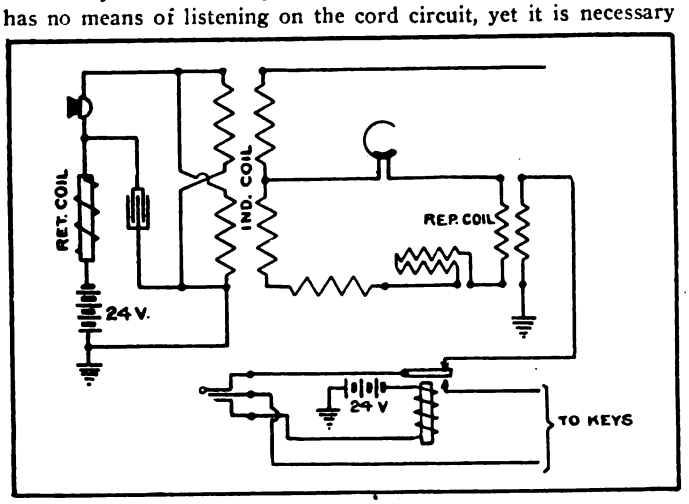

Fig. 758.

that her telephone set should be connected to the tip strand when she makes a test for a busy line before establishing a connection. The diagram, Fig. 758, shows how this is accomplished. It will be noted that the operator's receiver is shunted by the secondary winding of a special repeating coil. The primary of this coil is grounded at one end, while its other terminal is wired to the contact of a special relay. Through this contact and the armature of the relay, in the normal condition of the circuit the repeating coil is connected to the tip of the trunk plug. Assuming that a line is busy the sleeves of its multiple jacks will be at a potential different from that of the ground, as is well known. When, therefore, the tip of the plug is touched to the sleeve current passes over it, and through the primary of the repeating coil is ground. The current induced in the secondary winding of the repeating coil passes through the receiver, and causes a click which notifies the operator that the line is in use. If the line should not be busy, as the "busy test relay" winding is connected between the sleeve of the plug and negative battery the relay is operated, disconnecting the operator's set, and completing the connection for the tip side of the line. As this entire operation is performed without the manipulation of keys the origin of the term automatic is obvious.

ADJUSTING RELAY.—(759.)

Will you please tell me just why a relay armature is pulled up not only more quickly, but harder, when it is set up near the pole piece? I have proved by experiment that this is so, but do not know the reason. P. J.

The reason is that when the armature is set up near the pole piece the same current will actually produce a stronger pull in the magnet of the relay. The power of an electro-magnet depends upon the relation of two quantities which are in some respects analogous to electro-motive force and resistance. The first, called the magneto-motive force, is dependent for a given magnet core upon the number of ampere-turns in the field winding—that is upon the product of the number of turns into the amount of current. The second, called the reluctance, is dependent upon the nature of the materials entering into the magnetic circuit.

The reluctance of air is much greater than that of iron, so that in a magnetic circuit having a large air gap a given number of ampere-turns will produce a much weaker field than in a circuit containing a smaller air gap and the same amount of iron. Moreover, when the armature is close to the pole piece you not only diminish the proportion of air to iron, but actually shorten the circuit, so that of the lines of force available a larger proportion run directly from the iron of the magnet core to that of the armature, where their pull will be effective.

USE OF LAMP DIRECTLY IN LINE.—(760.)

We have a small magneto switchboard which we are very anxious to change to central energy at small expense. Could we not simply replace the drops by lamps, using the same cut-off jacks now in use? We have seen switchboards in buildings using magnetic signals wired on this scheme, and would like to know if it is practical for lamps. B. R.

The scheme of including a lamp directly in the line circuit was tried in the early days of the common battery switchboard and found to be impractical. In the first place the range of current through which the ordinary signal lamp will operate properly is very small. As in any exchange there are lines having various lengths, and consequently different resistances, it would be necessary to adjust your battery to the longest line, and introduce compensating resistances in the circuits of all your other lamps. Even then, especially if you operate party lines, you would have much trouble. A serious objection to this system would be that in case of a cross too much current would pass through the lamp, and if your board is not closely watched at night you would find burn-outs frequently. The use of relays in common battery switchboards was adopted to avoid troubles of this nature.

USE OF STRAIN INSULATORS.—(761.)

Will you please explain how "strain insulators" are used in telephone construction? B. N.

Strain insulators are generally inserted in guy wires which pass near sources of high potential. If a wire carrying heavy current should break and fall upon a guy wire used to support a telephone pole, and this were carried to a support near the ground the effect which would be produced upon a person touching it is obvious. It is therefore good practice to cut the guy wire at a point below any place which could by any recognizable combination of circumstances be brought in contact with the wire carrying the heavy current.

While it effectively insulates the two portions of the guy from each other the strain insulator, if properly constructed, will stand the pull exerted by the pole which it helps to support. In many places telephone companies are compelled by municipal regulations to use this precaution.

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THE EDITOR'S PAGE

INFORMALITY AND THE TELEPHONE.

HOT weather is the time when people shun all forms of effort. Exertion makes them uncomfortable, and anything which enables them to avoid it is a boon. So it is that the use of the telephone for social purposes is becoming from day to day to be more and more appreciated.

For making engagements the telephone is ideal. There is no delay, and a plan may be settled upon as soon as conceived. There is no bungling, nothing goes wrong, because all details may be taken up and agreed to by all interested at once. Then, when at the last moment an engagement must be broken the receiver may be removed from the hook and the thing done so simply. The explanation is given and can be made acceptable. Inconvenience to the person at the other end of the wire is prevented by the early notification, and all goes smoothly. The telephone in the office is a money maker, but in the home it is an indispensable convenience.

THE ATTITUDE OF SUBSCRIBERS TOWARD SERVICE TESTS.

THE opposition which many subscribers offer to the obtaintaining of records is one of the most puzzling conditions which telephone men have to meet. It has driven many a manager and traffic man into forming a most discouraging opinion of the intelligence and woful lack of common sense of those with whom he has had to deal.

In the times when service tests were made by inspectors who visited subscribers' stations, and took their observations at the telephone, people seem to take a most inexplicable interest in balking the efforts which were undertaken with a view to making it possible to give more rapid and reliable connections. It was apparent that in most cases the object of this work was thoroughly misunderstood. The service inspector was held under the suspicion which is visited upon all who do new things, the meaning of which is not generally understood. His motives in visiting the premises were questioned, and every operation carefully watched as if he were some new and unclassified criminal. His departure was likely to be followed, in the very least event, by a call for the manager of the exchange by the outraged subscriber, and not infrequently his work was temporarily stopped by measures which put him to still greater inconvenience.

The least thing of which he was suspected was an endeavor to obtain results which would injure the prospects of the operators, and the subscribers would be no party to any such tricks. People believed that if they permitted tests to be made from their instruments the operators would treasure up the injuries due to such connivance, and every busy report for months was assumed to be false, and the delay placed to the account of the man with the stop watch. It is significant that it was found more easy to change the method of testing than to educate the thousands of subscribers to give their assistance by keeping quiet and allowing matters to take their ordinary course.

Now that the central office itself is the location from which observations are most commonly taken traces of the same resentment are encountered. Any attempt at espionage on the lines by an employe of the telephone company is fully as likely to be loked upon as an unwarranted intrusion upon a private conversation as in any other light. The fact that such work is undertaken in a most thoroughly impersonal spirit is overlooked.

As the nature of the information sought is not well known perhaps there is a little more excuse for this attitude of intolerance than is generally believed to exist. The only remedy seems to be in educating all the subscribers, and naturally this should be applied as quickly and as thoroughly as possible. The publication in local papers of an explanation of these tests, the methods used, and the objects sought is a most simple and useful means of conveying the information which the public needs. After this the regular issuing of the records obtained would give to the people most interested a very desirable opportunity to know in exact terms what they are receiving, and keep before them in a pleasant fashion the constant efforts to improve facilities which are being made by the telephone companies.

STUDIED DISTRIBUTION.

ECONOMY is the key to the efforts which are now being made in so many quarters to work out improvements over existing methods of distributing the wires which connect the telephones of subscribers with the central office of the telephone company. Once a suitable transmission standard has been set there is secured a fixed basis which serves as a point of support for all future work in laying out the details of a system. Within the limits thus established, the efforts of the engineer are devoted to the planning of an arrangement which will secure the desired results with the least possible expenditure for initial construction and fixed annual charges in the future.

The new lines opened up by the plans which have resulted in the production of a great variety of sizes of cable, and the development of more varied schemes for open wire distribution have greatly increased the number of combinations available for working out a given result. The effect of this has been to attract the attention of the more enlightened telephone men to the exceedingly valuable and interesting opportunities offered by this branch of the art. Already some men have come to be known as specialists in distribution, and the important financial rewards which are reaped by the companies which have taken advantage of their services make this work especially attractive to those who see the direct personal advantages gained through the comparatively large remuneration which rewards their success.

At the present time the practice in heavy distribution seems to be well established, and efforts are being concentrated upon securing that flexibility of arrangement for terminals which will enable a district to be served with the least expenditure. Once the number of conduits and wires which must be laid down to serve a given district has been ascertained, from estimates made by the proper departments, the work of the engineer in selecting the proper sizes and types of cable is comparatively simple. For getting them into place the only variations from standard and well known practice occur in matters of detail which are usually due to the nature of the ground.

This simplicity is no longer maintained when the cables reach the district in which are located the present and prospective subscribers. Here, although the number of people, and even that of telephone users at the end of a ten or twenty year period may possibly be estimated with reasonable accuracy, few engineers will pin themselves down to definite figures for the growth in a given portion of a moderate sized district for each one of the next four or five years. This would be asking too much of human confidence.

Naturally, however, the men who are doing this work are looking for the best, and the thing to do seems to be, instead of wasting time carrying population guessing to lengths which may only lead to refinement of error, to lay out a distribution scheme sufficiently flexible to accommodate itself to any normal conditions of growth.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

WHEN A COUNCIL RESOLUTION IS NOT A CONTRACT.

While our city was under a provisional government, the city council adopted a resolution consenting to our use of the city streets and providing that we must grant the use of our poles free for the city fire alarm system. The city government has now been reorganized according to the laws of the state, and the council has adopted an ordinance requiring us to pay a certain sum as rental for every pole. This ordinance the police authorities threaten to enforce. Can the city do this after having given us the use of the streets in return for their use of our poles? Does not the resolution of the council and the city's use of our poles amount to a binding contract?

I. E. L.

IT has been held in a similar action that such a resolution did not constitute a contract between the city and the company so as to estop the city from subsequently adopting and enforcing an ordinance requiring an annual rental for each pole, to be paid the city. Municipalities having the power and charged with the duty of regulating the use of streets may impose a reasonable charge, in the nature of a rental, for the occupation of certain portions of their streets by telegraph and telephone companies. Such rental is valid, if reasonable, and is supposed to be reasonable until otherwise shown. The city would not be estopped by accepting the use of your poles for its fire alarm system from suing you to recover rent. The rent is imposed in the enforcement of local governmental supervision in the exercise of the police power. City of Pensacola v. Southern Bell Telep. Co., 37 S. 820.

FAILURE TO REGISTER ABSTRACTS.

How serious a mistake is the failure to comply with the statute requiring foreign corporations to register abstracts of their charters in each county of the state where they are engaged in business? The failure to file abstracts in our case was not done purposely but because we didn't understand it was necessary, and as soon as we found out what the provisions of the law were, we had the abstracts filed. Can our charter be forfeited for such a mistake?

C. L. T.

IT would be very unjust to decree the forfeiture of a charter for failure to comply with such a statute, especially where such non-compliance is not willful,. but occurs merely through inadvertence or mistake. It has been held that such a state of facts is not cause for forfeiture of the franchise of a telephone company at the suit of the state, especially where the statute is complied with on discovery of the mistake. State v. Cumberland Telep. & Teleg. Co., 86 S. W. 390.

RIGHT TO ERECT POLES IN STREET.

THE Central New York Telephone and Telegraph Company has secured a reversal of an order granting a temporary injunction to the village of Carthage. The question certified to the Court of Appeals of New York by the lower court in the case was this: "Has the plaintiff, the village of Carthage, the right and power to require and compel the defendant, the Central New York Telephone and Telegraph Company, to place the extension of its existing lines in the streets of said village in underground conduits?" The telephone company which was operating a telephone system in the village, made application to the Board of Trustees for permission to extend its telephone lines. After due consideration the board passed the following resolution:

"Resolved, That the said telephone company be allowed to maintain an exchange in said village by means of conduits under the streets only, the location of which is to be under the direction of this board. And it is further resolved that no more poles be erected by said company in said streets, and that such company be required to remove all its poles erected since January 1, 1905."

The company was served with a notice of this resolution, but continued to erect poles and string wires notwithstanding. The village sued for a permanent injunction enjoining the defendant from erecting any more poles in the streets and compelling the removal of those erected after January 1, 1905. The appellate division of the Supreme Court decided in favor of the village. The Court of Appeals reversed the decision of the appellate division. In their opinion, the latter court concluded that it was preferable to dispose of the matter upon the question of right rather than of illegal discrimination between two competing companies operating existing plants in the streets of the village. The opinion stated that it had long been the settled law of the state that telephone and telegraph companies derived their right to erect their poles and string their wires directly from the state. The village argued that from certain general provisions of the charter it could be implied that the legislature had delegated to the village the power to compel telegraph and telephone companies to place their wires underground. The village law read: "Poles and wires. To regulate the erection of telegraph, telephone or electric light poles, or the stringing of wires in, over or upon the streets or public ground, or upon, over or in front of any building or buildings." The court called attention to the fact that the legislature, when conferring upon these companies in the Transportation Corporations Law the authority to construct and maintain the necessary fixtures for their lines, used the words "upon, over or under" any of the public roads, and so on, while in the village law the language is "in, over or upon" the streets, and so on. The court concluded from this discrimination in the use of language that the village did not have authority to regulate the stringing of wires under the streets or in conduits. The court held that the power granted to the village was intended to authorize it to determine the location of the poles and the streets to be occupied and did not authorize villages to pass resolutions requiring the elimination of open air construction and the placing of wires in conduits. Village of Carthage vs. Cent. N. Y. Tel. & Tel. Co., 178 N. E. 165.

FAILURE TO MAKE POLES SECURE ON HIGHWAY.

THE Forest City Telephone Company had erected its poles along the highway in Rutherford County, N. C. A force of men, engaged in ditching, worked close up to a pole which was thereby rendered insecure and liable to fall. A road hand notified a lineman of the company of the pole's unsafe condition, but the condition was not removed, and the pole fell across the street with the lines attached, blocking the road. A man going along the road with a wagon, in order to clear the way for himself and others to pass, set the pole back in the hole from which it had fallen, and propped it up securely, as he thought. Soon after, while a woman was passing along the way, the pole fell and killed her. The administrator of the deceased sued the telephone company and submitted to a non-suit on receiving from the court an intimation that it would charge that if the third person raised the pole from the ground and placed it in the hole where it had formerly been, and thereafter it fell and injured the deceased, the act of the third person was the cause of the injury instead of the company's negligence. The Supreme Court reversed this decision on the ground that it should have been left to the jury to determine whether the negligence of the third person or the negligence of the company was the cause of the accident. Harten v. Forest City Telep. Co., 54 Southeastern, 299.

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IN THE OPERATING FIELD

CONVENTION OF PENNSYLVANIA INDEPENDENT TELEPHONE ASSOCIATION TO BE HELD SEPTEMBER 11 AND 12.

THE third annual convention of the Pennsylvania State Independent Telephone Association will be held in Allentown, Pa., on September 11 and 12, 1906.

The members of the committee in charge are working hard to make this convention the most enthusiastic and successful ever held by the association, and they are being assisted in this work by the members all over the State.

The Pennsylvania Association has always made an excellent showing, not only at its home conventions, but at the national conventions. At the last national convention held in Chicago last June, Pennsylvania had a larger representation than any other one state and was well represented upon important committees.

As Allentown, Pa., is but a two hours' ride from New York City, it is expected that several representatives of the City of New York will be present at this convention, to obtain information regarding the Independent movement, to be used in connection with the application for an Independent franchise in New York City.

Every Independent telephone man in the United States is invited by the association to attend this convention and meet the Pennsylvania men, and it is hoped that many new faces will be found among those present at Allentown, Pa., September 11 and 12, 1906.

SOUTH BEND HOME TELEPHONE COMPANY SOLD TO CHICAGO CAPITALISTS.

AT a recent meeting of the stockholders of the South Bend (Ind.) Home Telephone Company, the control of the company was sold to Joseph Harris, vice-president of the Automatic Electric Company of Chicago. It is reported that the new interests which have acquired control of the system intend to make South Bend a distributing point for toll lines running out from Chicago. Extensive alterations of the plant and further development of the local business will be actively undertaken. Theodore Thorward, who has been president of the company, will continue to have the active direction of its development.

DEMOCRATS IN TEXAS MAKE INTERCONNECTION OF TELEPHONE SYSTEMS A CAMPAIGN ISSUE.

THE Democratic state convention at its recent session adopted a platform which contains a plank requiring that the next legislature enact a law compelling all telegraph and telephone companies to make wire and business connection with each other at all common points in the state.

When this plank was offered in the committee it was strongly opposed by some of the members, but after arguments in its favor had been made it was adopted. United States Senator J. W. Bailey, who was a member of the platform committee, was among those who opposed the adoption of the plank.

It was argued by those who opposed the plank that there was no general demand on the part of the people for the proposed legislation, and that it would work an unnecessary hardship and heavy expense upon the telegraph and telephone companies.

Colonel Thomas Campbell in his speech accepting the nomination for Governor stated that he would see that every platform demand was enacted into law by the legislature if he had to keep that body in continual session in order to secure that result. This announcement causes much apprehension that the unusual legislation proposed in regard to telegraph and telephone companies may become a reality.

J. E. Farnsworth, of Dallas, vice-president and general manager of the Southwestern Telegraph and Telephone Company (Bell), has announced that he is opposed to the enactment of such a law.

THE NIAGARA FALLS CONVENTION.

THE enthusiasm which the Independent telephone men of New York have shown in building up in a very brief time a large group of exchanges, which by the quality of their service have won the hearty support of all subscribers, is shown also by the large attendance which is promised for the convention at Niagara Falls. Secretary R. M. Eaton issued invitations to the managers and officers of every Independent company in the State. A most excellent program has been prepared and Niagara Falls is ready to do its best for the entertainment of the visitors who are building up in other places telephone systems with the same object which has so thoroughly won the approval of its own citizens. Early in the preceding week it was sure that at least three hundred delegates would be present at the convention, and they are all prepared to make it one of the most successful meetings ever held.

R. M. Eaton, Secretary of the New York State Independent Telephone Association.

BOOK REVIEW.

WIRELESS TELEGRAPHY AND TELEPHONY, by Prof. Domenico Mazotto; 409 pages and 253 illustrations. Published by Whittaker & Company, 2 White Hart street, Paternoster square, London, E. C., England, and Macmillan & Company, 64-66 Fifth avenue, New York. Price $2.00.

This book is a very complete outline of the present state of the art of wireless transmission of signals. It is opened by a statement of the principles which have been taken advantage of by those who have developed practical systems, and these chapters are followed by descriptions of the apparatus employed by different prominent inventors. The descriptions are thoroughly well illustrated by diagrams, and are given in sufficient detail to enable the reader to obtain a clear idea of the principles involved, and the operation of the apparatus as well as the methods of constructing the various systems in use.

A history of important experiments in wireless telegraphy up to date is given, and a very interesting chapter devoted to applications and conclusions.

The book should be useful to students who wish to experiment in this very interesting branch of the art of transmitting intelligence, and is sufficiently readable to be a not inappropriate treatise for those who wish to read simply in order that they may know what progress has been made.

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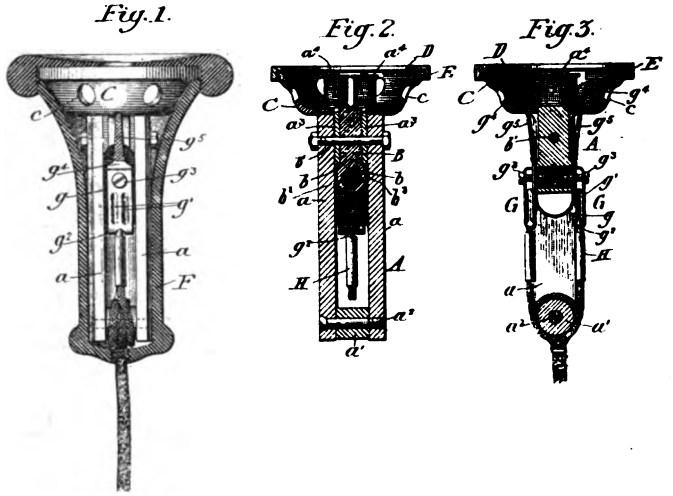
TELEPHONE PATENTS

RECEIVER.

Ray H. Manson, Elyria, Ohio, patents (No. 828,946; dated Aug. 21, 1906; filed Aug. 3, 1904; serial No. 219,567) and assigns to the Dean Electric Company, Elyria, Ohio, a telephone receiver.

The object of the inventor is to provide a receiver the magnetic



structure of which is of a simple design which may be readily assembled to form a rigid unit. The two limbs of the permanent magnet *a* are held in position by the bolts a^2 and *b'* and have at the lower end a yoke *a'* of magnetic material. Soft iron pole-pieces a^3 are held in place between non-magnetic bridge block *B* and the limbs of the permanent magnet. The binding clamps *G* are mounted on this bridge block but insulated from it by the block of fibre *g* and insulating plug b^3, which is keyed at b^5. The upper ends of these clamps are covered with insulating material and extend into the cup shaped member *C* where they are connected with the winding of the electromagnets a^4, while the lower ends are turned up, forming a loop as shown. The cord circuit terminals *H* are introduced through holes in the loops of these clamps and are held firmly between the parallel ridges *g'*. To make the magnet structure self-contained the cup shaped member *C* supports the diaphragm which is held in place by the threaded ring *E*. Holes *c* are provided in *C* to obviate any damping effect that the confined air might cause. Noteworthy features are that the diaphragm is held in place without depending upon the rubber shell, and that all connections are made and supported on the cup-block *B*, so that the magnets can be removed without destroying the connections.

INSULATOR.

August Biele, New Haven, Mo., patents (No. 823,912; dated June 19, 1906; filed July 25, 1905; serial No. 271,220) insulator.

A method of supporting telephone or telegraph wires without the use of cross arm pins and insulators of the ordinary type is provided for in this invention. The advantages claimed are that these insulators are less liable to be broken or shot to pieces by mischievous boys with toy guns or slings. The insulator consists of a cylinder made of glass or other non-conducting material, having formed into its surface several grooves of a size adapted to take ordinary line wire. For receiving the tie wire a hole through the glass of the insulator is provided. The insulator is intended to be placed in a hole bored horizontally through the cross-arm near its top. A slot cut from the top of the arm is carried to the surface of the insulator. The line wire may be slipped into the slot in the insulator through this groove, and then, by turning the glass cylinder, be brought into such a position that it is impossible for the wire to slip out. A transverse groove is provided in the cylinder and a suitable key may be inserted in this groove. A template upon the top of the cross arm assists the lineman in properly locating this key.

SWITCHBOARD.

Milo G. Kellogg, Chicago, Ill., patents (No. 817,781; dated April 17, 1906; filed November 30, 1891; serial No. 413,608) and assigns to the Kellogg Switchboard and Supply Co., Chicago, Ill., a multiple switchboard.

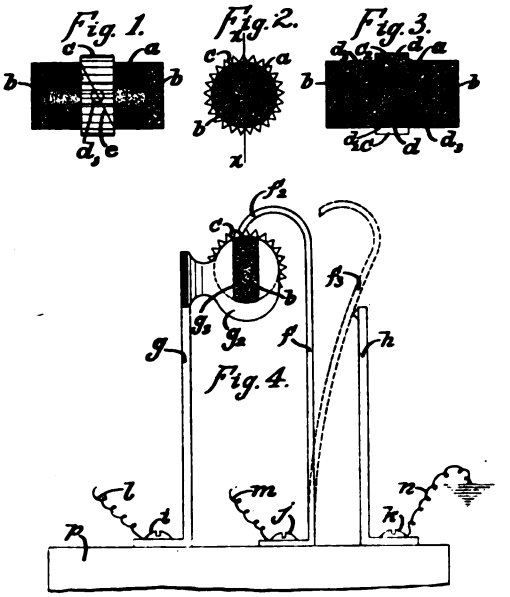
This invention relates to a telephone exchange system in which part of the lines are grounded and others metallic. The description and claims cover line, switching and substation apparatus for a system adapted to these conditions.

THERMAL PROTECTOR.

Frank B. Cook, Chicago, Ill., patents (No. 803,881; dated Nov. 7, 1905; filed March 26, 1904; serial No. 200,171) a self-soldering thermal protector.

The inventor provides for a thermal protector of the self-soldering type in which the heat is generated by the passage of current through a resistance consisting of a block of graphite or similar material. Fig. 1 is a side elevation of the protector, Fig. 2 an end view, and Fig. 3 a section on the line *x x* of Fig. 2. Fig. 4 shows the complete protector assembled.

The cylindrical block of graphite *a* has an annular grove d_1 which receives the split metallic ring *c*. This ring is provided with teeth as shown. In the bottom of the annular groove are a number of holes d_3 filled with a heat-susceptible material. The protector is held firmly between two clips g_2 on the standard *g*



as shown in Fig. 4. Wires *l* and *m* are line wires and *n* leads to ground. A heavy current heats the graphite, softens the heat-susceptible material and allows ring *c* to revolve, releasing the spring *f*. The circuit is thus broken and the line grounded on *h*. On cooling the device may be reset by hooking spring *f* on the toothed ring. The inventor claims that the protector may be used a number of times without the renewal of any of its parts.

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

NEW STORAGE BATTERY PLANT AT TOLEDO.

AT the annual meeting of the stockholders of the Toledo Storage Battery Company of Toledo, Ohio, it was decided to erect a new plant at West Toledo, two acres of land having been purchased already. Three buildings will be erected, one to be two stories high, 100 feet long and 30 feet wide, another to be one story high, 120 feet long and 20 feet wide, while the third building will be for a powerhouse. The company, upon the completion of the new plant in November, will give employment to about 50 men, which force will be gradually increased. The following officers were elected for the ensuing year: President and general manager, C. A. Byers, who recently resigned his position as president of the Ames-Bonner Co., of Toledo; vice-president, J. M. Skinner, who is president of the J. M. Skinner Bending Company, of Toledo; secretary and treasurer, A. C. Ash; the board of directors, Messrs. Byers, Skinner, Ash, C. E. B. Lamson, George J. Miller, L. B. Hamilton and L. A. Alexander. Mr. Hamilton resigned as secretary, treasurer and general manager of the company to devote his entire time to other business. Mr. Miller, inventor of the concern's battery, is electro-chemist of the plant. The company will maintain its present location on Ottawa street until the new plant is ready for occupancy, at which time it will prepare for the general expansion of its business.

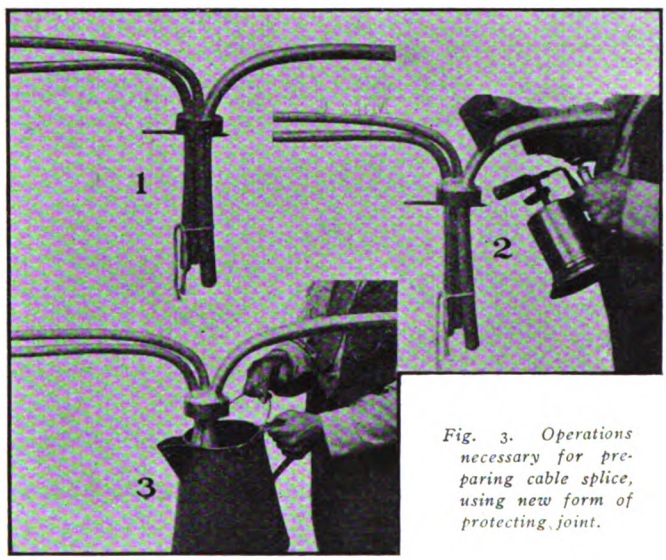

Fig. 3. Operations necessary for preparing cable splice, using new form of protecting joint.

A NEW CABLE JOINT.

THAT it is a practical mechanical cable joint is agreed by many people who have seen the one recently invented by L. Hargis and C. E. Teush of Evansville, Ind. The inventors claim that it fulfils the well known requirement of being absolutely tight, and that its installation requires a minimum of time and labor and consequently of expense.

It consists of a lead sleeve closed at one end, the other end being sweated to an externally threaded brass collar which screws into an internally threaded brass cap. The brass cap has an extended rim and an inward offset for supporting a lead gasket. This gasket may be bored for the number and size of cables which it is desired to splice. Under the offset in the brass cap is a rubber washer. The act of screwing on the bottom of the sleeve binds the rubber washer against the lower side of the offset, and makes the joint perfect.

The method of installing the joint is substantially as follows, reference being made to numbered figures in the two group illustrations shown in Figs. 3 and 4. The cables are bent at right angles to

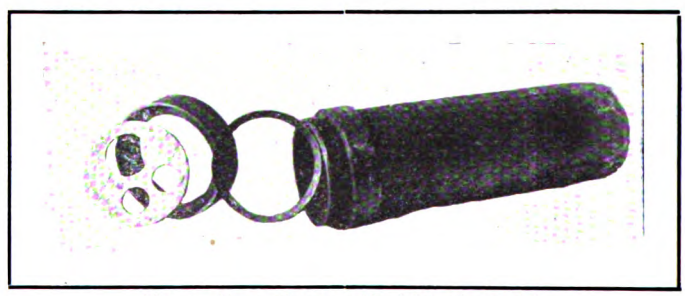

Fig. 2. Parts of new cable joint, dismantled.

the messenger and the lead gasket put on. (No. 1.) The brass cap is then drawn up under the gasket and wedged or tied in place, the cable and gasket having been previously shaved so the solder will adhere readily. The solder, at a little above wiping heat, is then poured in until the cup formed by gasket resting on the off-set is filled to desired height. Any roughness left by solder being poured unevenly is then smoothed with a blow-torch and wiping-cloth. (No. 2.) When the cables have thus been firmly fixed in the cap the armor is removed from them. This is done easily if before they are put through the gasket the cables have been marked around with a chipping knife so that a slight bend will cause the armor to break where it is marked. Exposed wires can then be boiled out (No. 3), spliced (No. 4), and laced (No. 5) in the usual manner. The joint is completed by screwing on the bottom of the sleeve (No. 6).

The completed joint is said to have many advantages over a horizontal wiped joint. One of these is that it is accessible at all times for testing or changing a multiple. A "pair" can be picked out in much less time than is possible in a horizontal splice. This is due to the fact that one end of the splice is loose, and as a pair is tested it can be bent back out of the way.

A number of pairs may be left dead in a sleeve, and when these pairs are required it is simply necessary to bore a hole in the

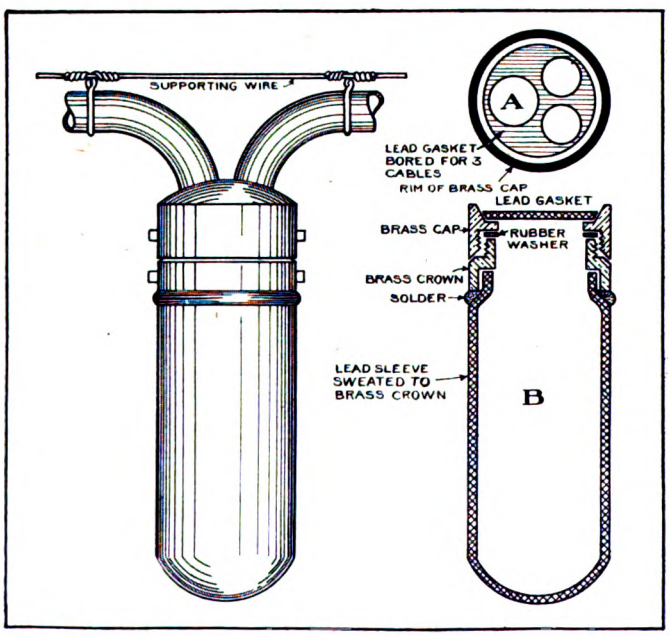

Fig. 1. Drawings showing construction of new cable joint invented by L. Hargis and C. E. Teush.

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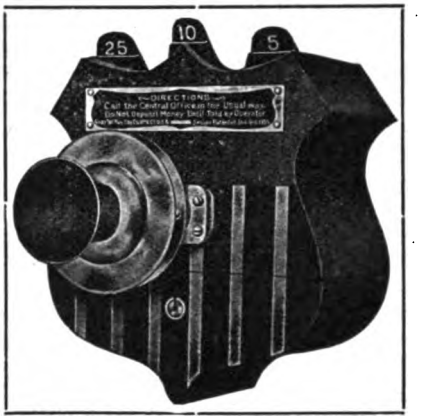

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DRAUGHTSMEN—Mechanical, electrical, structural, architectural—are at a premium. In a recent issue of "Opportunities," our monthly publication, we listed 104 positions for draughtsmen at salaries of $900-$2,500. Sample copy of "Opportunities" is free for the asking. Hapgoods, 305 Broadway, New York. 464

WANTED—One first-class line construction foreman; also four first-class telephone installers and line inspectors. Address Box 659, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 659

WIRE CHIEF wants position, C. E. plant of three or four thousand telephones. References. Address Box 662, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 662

WANTED---Continued

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YOUNG MAN with five years' experience in telephone work would like position as traffic manager of a progressive Independent telephone company. Understands both the adjusting and soliciting and also the practical end of the business. Address Box 666, care THE AMERICAN TELEPHONE JOURNAL, New York. 666

WANTED—Practical telephone man desires position as superintendent or trouble shooter on magneto system. Eleven years' experience. Best of references. Iowa or Minnesota preferred. Address Box 667, care THE AMERICAN TELEPHONE JOURNAL, New York City. 667

WANTED—City foreman competent to superintend outside construction and locate and repair cable faults. Plant 2,500 subscribers. State experience, reference and salary. Address Box 668, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 668

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"leaded" top to fit the size of cable required to splice the dead pairs, then "lead" this cable in and connect it as was done with the original cables.

A splice can be boiled out without the use of a drip-pan, as the boiling pot can be brought up under the splice so that the wires go directly into the paraffine. This method of boiling out entails absolutely no waste of paraffine. The saving this makes is shown by the common experience that every cable splicer's platform is soaked with the paraffine that is wasted by using a drip-pan.

No splice need ever be left open over night. The top of the sleeve can be "leaded" in a few minutes. The armor can then be taken off, the wires laced to prevent damage to the insulation, and the bottom of sleeve screwed on.

Every joint can be made a branch joint. The greater the number of branches the smaller the amount of solder necessary to make the joint.

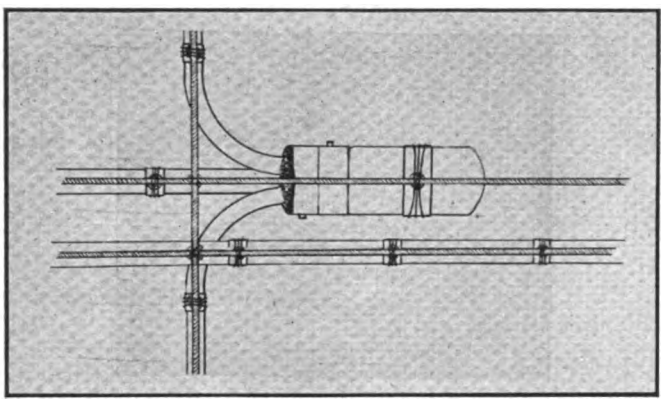


Fig. 5. Method of suspending cable joint from messenger wires for aerial work.

A sleeve can be used any number of times. When a cable is taken down the ends can be taken out of the sleeve, a new gasket put in, and the sleeve is as good as new. The soldered part of joint is on top where it can readily be examined for pin holes.

It is peculiarly adapted to underground work, for the reason that its shape allows of the greatest economy of space in manholes. This style of joint lends itself to some very pretty work in making turns at a branch joint in aerial cable as shown in the plan view, Fig. 5. There are so many forms of cable work to which this joint is adaptable that its use will deserve very thorough investigation. It has recently been put on the market by W. N. Matthews & Bro., 219 No. Second street, St. Louis, Mo., who will be pleased to send further information to all inquirers.

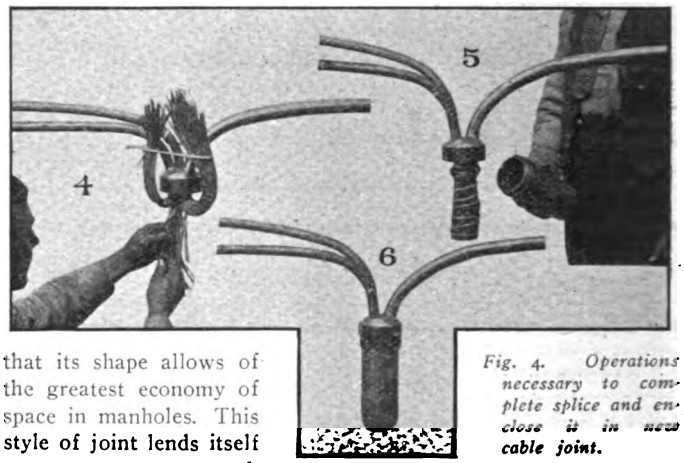
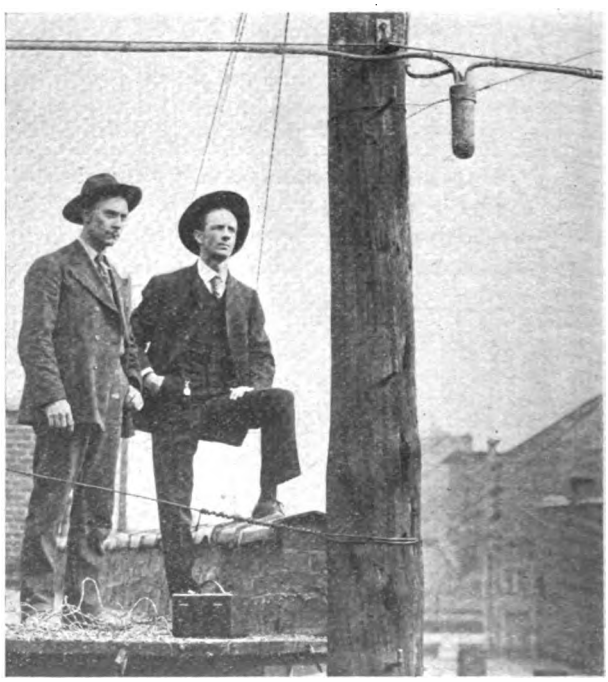


Fig. 4. Operations necessary to complete splice and enclose it in new cable joint.

THE W. G. NAGEL ELECTRIC COMPANY, Toledo, O., reports an increasing demand for the Robinson Pole Distribution Rack. This is said to meet all requirements of exchanges which are anxious to pay for only a small amount of material at the time of installation, but to be prepared to meet all demands for new facilities.

The new joint may be easily opened for testing. It involves only the simplest kind of hand-work.



The time consumed in opening joint, making test, and closing joint is very small.

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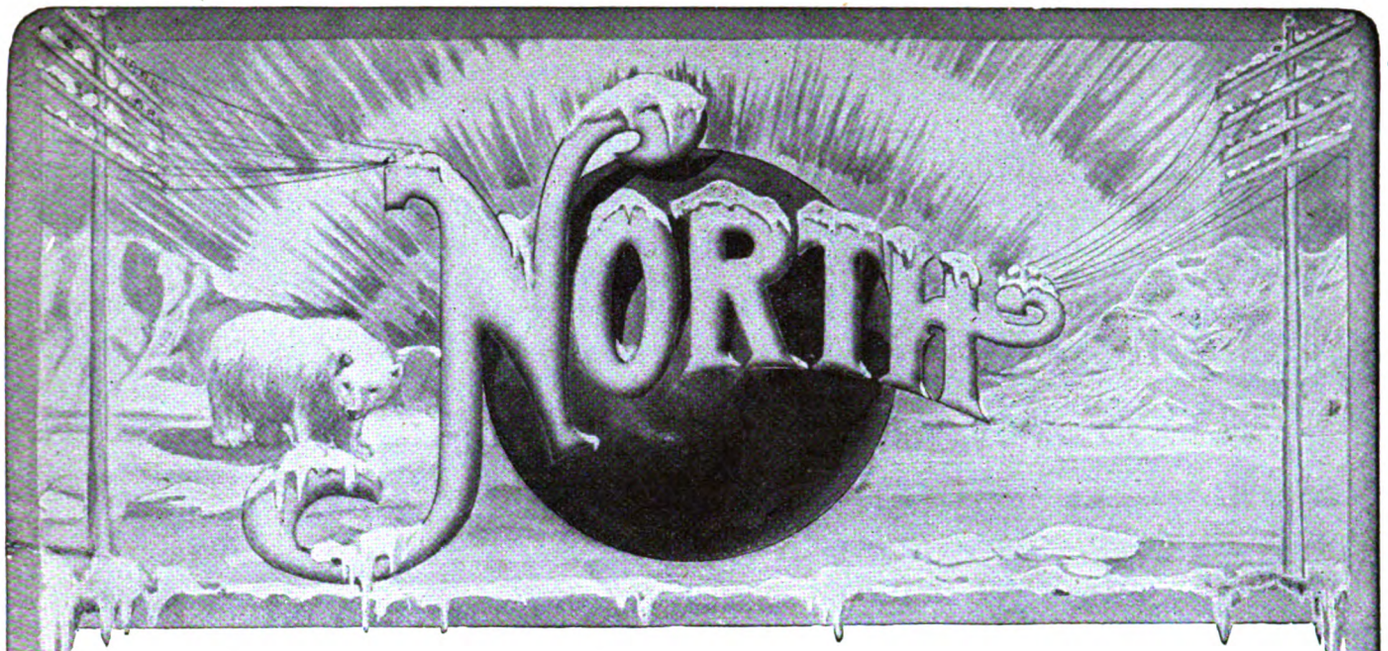
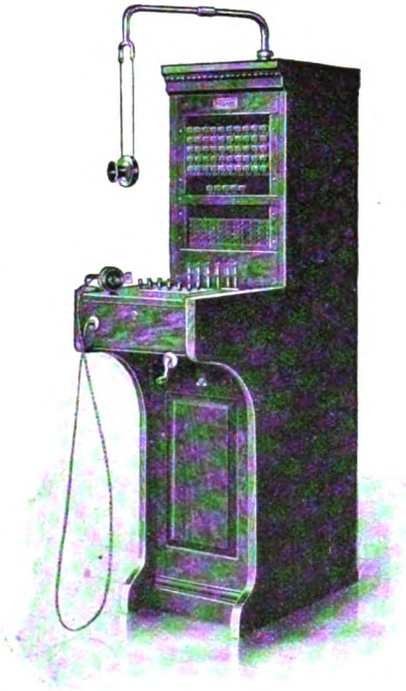


Another of North's Unit Type Switchboards--



a new one—has a capacity for fifty lines—will accommodate twenty more with a little crowding.

Built for the small exchange that is expected to grow. With this type of switchboard it is necessary to purchase for your immediate needs only. You can buy the cabinet wired to its full capacity and equipped with as few as ten lines. The capacity can be increased at any time by additions of ten line strips of drops and jacks. Additions are easily made—just screw the strips to the mounting frames and solder the wires to the terminals. Wired for eight cord pairs—equipped as desired—additional pairs easily installed.

When all the lines are full add on another cabinet, move the transmitter support to the center and go ahead—no cutting or marring of moulding—a nice feature should you want to separate the cabinets and use them in different places.

Built with the same care and attention to details as the larger capacity boards—the apparatus has the same standard parts.

The cabinet is quartered oak, kiln dried, hand polished. Hinged keyboard, front and back panels removable for access to wiring and parts. Leather-covered plug shelf—cushioned plug seats.

The drops are very sensitive and free from cross talk—coils incased in soft iron shells—not tubes of sheet steel formed up, but solid Norway rods bored out. Mounted in banks of ten, apart from jacks.

The jacks also mounted in strips of ten and easily removed. Aluminum base, German silver springs and pure platinum contacts. They cut out both sides of drop and keep line balanced.

Roller bearing keys with German silver springs and pure platinum contacts.

THE
NORTH ELECTRIC CO.
CLEVELAND, OHIO

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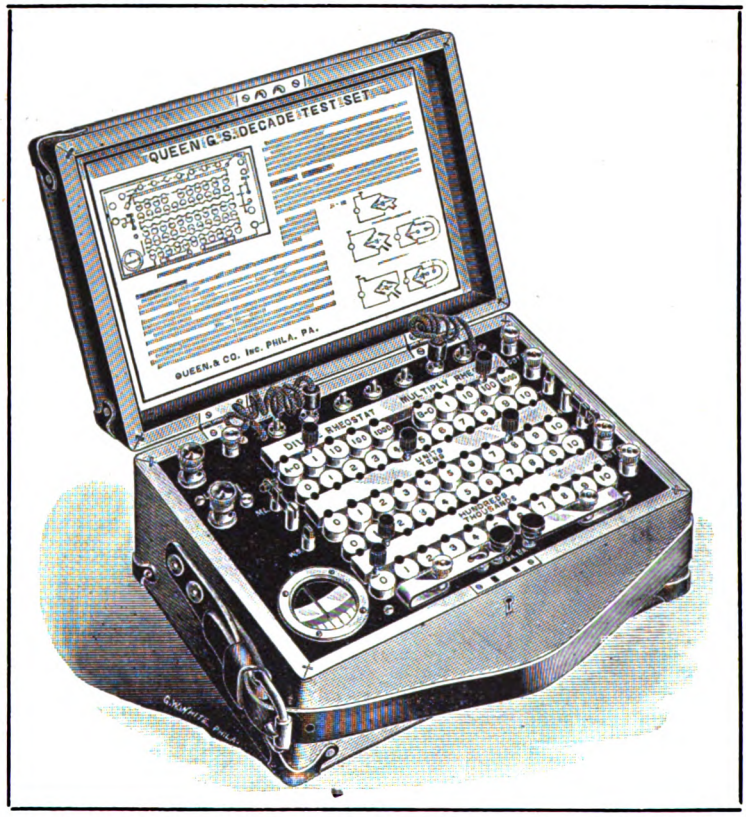
A NEW PORTABLE TESTING SET.

THE Queen G. S. Portable Test Set illustrated herewith is a type recently put on the market to meet the revised Navy Department Portable Testing Set specifications, which have been altered considerably and made much more exacting than heretofore.

The arrangement of this set has therefore been made with not only these specifications in mind, but also with a view to securing the maximum portability with due regard to convenience in mechanical arrangement, while the connections of circuits are such that a large variety of tests beyond those indicated in the Government specifications may be executed. It, therefore, forms an excellent set for the use of telephone and telegraph companies, electric light and power stations and electrical engineers who find it necessary to make a wide variety of measurements and prefer one complete testing instrument to a large number of individual pieces.

It consists in general of a Wheatstone bridge with a 1, 10, 100 and 1,000 ohm coil in each arm. The rheostat consists of 10 coils of units, tens, hundreds, and thousand denominations, the last or tenth coil being added for convenience in checking up the next higher series of coils; that is, the ten coils in the unit row in series can be checked with the first coil in the ten row and likewise the ten ten ohm coils can be checked against the first 100 ohm coil, etc. This is an operation which confirms the accuracy of adjustment, but one not possible to execute in a Decade Set where each row consists of but nine coils.

The bridge and rheostat are properly connected to the company's improved D'Arsonval galvanometer, which is dead-beat and of such high sensibility that a change of 1-10 of one per cent. in the rheostat when measuring resistance of approximately 1,000 ohms value will give a decided galvanometer deflection. The needle is perfectly free from outside magnetic influences and so balanced that the test set can be used in practically any position; it is also provided with an adjustment lever so that the pointer of the galvanometer can also be made to indicate zero.



The New Portable Testing Set Made by Queen & Co. to Meet the Revised Navy Specifications.

The battery consists of six chloride of silver cells connected so that any one or number up to six in series may be used, while a pair of binding posts allows the use of an outside battery when desired.

Both the galvanometer and battery keys are on the front of the case in a most convenient location, and are made extra heavy with a liberal supply of platinum iridium at the actual contact points.

Binding posts and a small switch allow the use of an outside galvanometer if desired.

A ground post, as well as an auxiliary galvanometer switch is provided so that both the Murray and Varley loop tests can be executed. The resistance coils in the bridge arms are adjusted to an accuracy of 1-20 per cent., while that of the rheostat coils is 1-10 per cent., the wires used being manganin and having a negligible temperature coefficient. All the spools are well shellacked, properly baked and aged before standardizing. To the hard rubber plate, which is highly polished, and of exceptionally good quality, are securely fastened the resistance coils, galvanometers, battery, etc., so that by removing this plate all interior parts are taken out at the same time.

The individual cells of battery can be removed by unscrewing a small section of the bottom of the case, which exposes them to view, when the connections can be easily loosened and new cells inserted should this be found necessary.

The over-all dimensions of the set are approximately 12 x 8 x 6 inches, and the weight is about 12 lbs., the case being made of polished quartered oak, and protected with nickel plated brass corner pieces.

In addition to the usual measurements of resistance, this set can be used for locating grounds, crosses and other cable troubles utilizing either the Murray or Varley loop tests. It can be used for insulation resistance measurements and numerous other tests, such as checking up voltmeters and ammeters, measuring battery resistance, etc. A more detailed description of this set is given in a pamphlet which will be sent to intending purchasers by the manufacturers.

The instrument is made by Queen & Company, Inc., Philadelphia, who would be pleased to answer any inquiries concerning it.

THE ELECTRIC CABLE COMPANY of 17 Battery Place, New York, is now placing on the market for the first time a new waterproofing paint. This material has been brought to the attention of the United States government authorities at Washington and they have placed a large order with this company for a paint which shall be used on the bottoms of government vessels. The Marine Department of the New York Central Railroad Company has likewise placed an order for a waterproof paint that shall be applied to the bottoms of their tug boats to prevent fouling and corrosive action. The paint has been used with success on cable and wire reels which sometimes take up as much as eight or ten pounds of water during shipment, thus causing annoyance to the purchaser who must pay the transportation charges on absorbed water. It is claimed that this waterproof paint may be made up in any color, and that in addition to its absolute waterproof qualities the color remains permanent and the paint will not flake off nor crystallize. It has already been successfully used to prevent electrolysis and corrosion on structural steel, stone work, wooden piles, rail bonds and concrete work. This paint has been made up into a colorless compound for use on stone work and wood work on which the original color is to be preserved.

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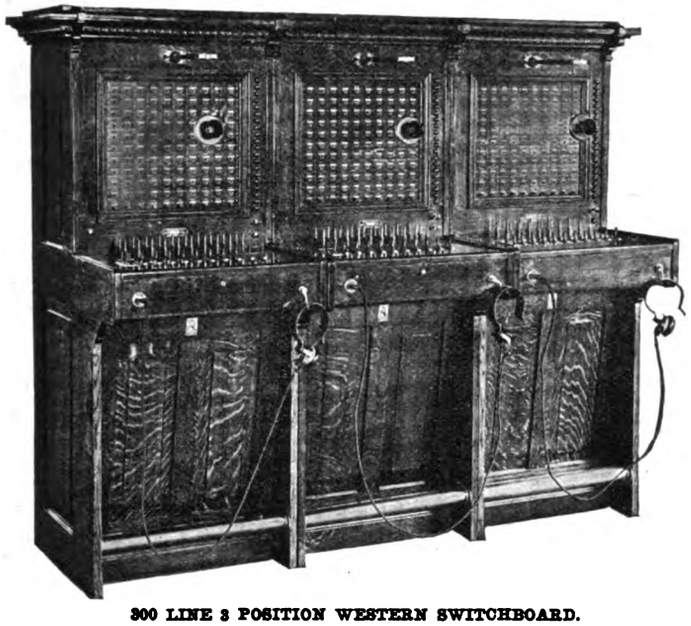
NEW PRODUCTS *from*

THE PIONEER INDEPENDENT TELEPHONE FACTORY



300 LINE 3 POSITION WESTERN SWITCHBOARD.

WESTERN LIGHTNING ARRESTER CABINET.

Western Telephone Manufacturing Company

58 West Jackson Boulevard CHICAGO Established 1893

Are You Building for the Present or the Future?

This is a vital question. Perhaps you haven't given as much thought to it as you should.

Poles on the average do not last more than eight years. The available supply is rapidly diminishing, hence when the time arrives for reconstruction the cost will be considerably more than it is at present.

The question then is, "Can the life of poles be extended?"

The answer is, "Yes, by using Avenarius Carbolineum."

This liquid preparation will double the life of poles to which it is applied and at the same time strengthens the fibre of the timber.

Write for book of proof and ask for prices. You will be surprised.

Cheap as Paint. Good as Gold

Carbolineum Wood Preserving Co.

126 Reed Street Milwaukee, Wis.

SIMPLICITY

OF OPERATION PROMOTES SPEED AND ACCURACY

THE CALCULAGRAPH

is easily and quickly operated

and it times all toll messages exactly. It prints the number of minutes and quarter minutes the line is in use and determines the overtime charge.

Cut out the waste—Get a Calculagraph and increase the revenue from your toll lines.

It makes no clerical errors.

Write for booklet.

The Calculagraph Company

1487 Jewelers Building NEW YORK CITY

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THE WEEK'S MESSAGES

NEW COMPANIES.

PORTALES, N. M.—The Roosevelt Telephone Company, of Portales, has been incorporated with a capital stock of $25,000.

CASTLETON, N. Y.—The Upper Hudson Telephone Company, with a capital stock of $10,000, has filed articles of incorporation. The company proposes to operate in several counties in the State. Its principal offices will be located at Castleton, and lines will be built in Rensselaer and Green counties. The following directors have been elected: Martin H. Springsteed, of Castleton, and Wakely Best and Alberti Baker, of Coxsackie.

SCHENEVUS, N. Y.—The Schenevus-Worcester Home Telephone Company has been incorporated with a capital stock of $25,000. The incorporators are John T. McKown, Maryland, N. Y.; Ira D. Tipple, Elk Creek, N. J.; Ira E. Gifford, Schenevus, N. Y.

EDGELEY, N. D.—Articles of incorporation have been filed by the Pomona Valley Telephone Company, of Edgeley, N. D. The capital stock is placed at $50,000, and the incorporators are L. A. Ueland, L. P. Ormsby and C. M. Washburn, of Edgeley.

CARMEN, OKLA.—The Mutual Telephone Company of Carmen, Okla., with $5,000 capital stock, has been incorporated. Among the incorporators are S. K. Bowyer, P. B. Watrous, T. R. Lackay, C. M. Robbins, D. R. Cron, all of Carmen; W. H. Slack of Augusta.

COCHRANTON, PA.—The Merchants' and Farmers' Telephone Company, of Cochranton, has been incorporated with a capital stock of $5,000.

HOLLOW ROCK, TENN.—The Hollow Rock Dixie Telephone Company, Hollow Rock, Tenn., has been incorporated with a capital stock of $1,000.

ENTIAT, WASH.—Articles of incorporation have been filed by the Entiat Telephone & Telegraph Company. The company has a capitalization of $10,000, and the following are among the incorporators: Frank E. Knapp, D. M. Farris and P. M. Martin.

WATERVILLE, WASH.—The Farmers' Independent Telephone Company, of Waterville, Wash., has been incorporated with a capital stock of $5,200. The incorporators are W. H. Ogle, J. C. Brenesholtz, C. V. Ogle, J. B. Higgins and J. K. P. Carson.

LACLEDE, W. VA.—The Union Ridge and Ohio River Telephone Company, with a capital stock of $5,000, has been incorporated. Its principal offices will be at Laclede, and the incorporators are H. W. Carson, of Ona; F. A. MacDonald, of Huntington, and others.

GREEN BAY, WIS.—The Bay Shore Telephone Company has filed articles of incorporation. Its capital stock has been placed at $10,000, and the incorporators and Henry F. Hagemeister, Frank J. B. Douchateau and C. A. Straubel.

FRANCHISES.

RED BLUFF, CAL.—Messrs. Graves and Wheeler have made application for a franchise to operate an Independent telephone company at Red Bluff in opposition to the Bell Telephone Company, which has enjoyed a monopoly at this place.

BARDSTOWN, KY.—The city telephone franchise of Bardstown, Ky., has been sold to B. P. Grigsby and John A. Fulton. It is extremely probable that an Independent telephone system will be established at this city by the more prominent business men and long distance connections with the Home Telephone Company are practically assured.

HARRODSBURG, KY.—A telephone franchise for ten years has been secured by F. P. James, cashier of the Mercer National Bank, representing local capitalists, and $10,000 worth of stock taken up. Steps will be taken at once to construct a new, up-to-date system to connect with the Home Telephone Company.

BROCKTON, MASS.—The franchise for which it recently applied has been granted to the Home Automatic Telephone Company by the Mayor of Brockton.

CROOKSTON, MINN.—Application has been made by the Tri-State Telephone Company for permission to construct a telephone system at Crookston.

BISMARCK, N. D.—The Interstate Electric & Telephone Company has been granted a franchise at Bismarck.

MANDAN, N. D.—A franchise has been granted to the Inter-State Electric & Telephone Company to construct telephone lines in the city of Mandan, and to install and operate a telephone exchange at that point.

VALLEY CITY, N. D.—The Valley City Telephone Company has applied for a new franchise, notwithstanding the fact that its present one does not expire for six years. The application is made in order that the company may issue long term bonds. It agrees to put its wires underground at the order of the council; the city is guaranteed free telephones and the rights of the city and its citizens are safeguarded.

OREGON CITY, OREGON.—The Clackamas County Court has granted a franchise to the Northwest Long Distance Telephone Company, of Portland, to construct and maintain a telephone system throughout the county.

PROVIDENCE, R. I.—The Home Telephone Company, whose attorneys are Barney & Lee, of Providence, has secured another franchise at South Kingston. It has already secured franchises at Warwick, Coventry, Burrillville, Cumberland, South Kingsland and Scituate, and has applications pending in Providence, Pawtucket, Central Falls, Middletown, Bristol, East Greenwich, Little Compton and two other towns. The company has filed a bond for $50,000 at the State capitol as a guarantee of its financial responsibility.

HOUSTON, TEXAS.—A charter has been granted to G. O. W. Burkett, L. J. Barnes and others to construct a new telephone line in a number of counties in Texas, with headquarters in Houston.

FINANCIAL.

GREENVILLE, ILL.—The Bond County Telephone Company, Greenville, Ill., has increased its capital stock from $6,000 to $18,000.

BALLWIN, MO.—The Ballwin Mutual Telephone Company has increased its capital stock from $2,000 to $12,000.

ILLMO, MO.—The Kelso Telephone Company has increased its capital stock from $5,000 to $10,000.

YANKTON, S. D.—The Independent Telephone Company of Yankton, S. D., at a special meeting voted to increase its capital stock to $500,000, and provide for the issue of same in two classes, preferred and common stock; the preferred to consist of $300,000 7 per cent stock and $200,000 common stock.

WHEELING, WEST VA.—The National Telephone Company, Wheeling, West Va., has declared a semi-annual dividend of 3 per cent.

COMBINATIONS.

GREENVILLE, ILL.—The Bond County Telephone Co. has acquired the property of the Mutual Construction Co., and the combination will be known as the Bond County Telephone Company.

ADAMS, NEB.—The Johnson County Home Telephone Company has purchased the business of the Adams Telephone Co.

OMAHA, NEB.—The Heim-Parmelee-Pollock and the Home Telephone Company, both Independent companies, which have been seeking franchises at Omaha, have combined under the name of the Home Company. The promoters have decided to incorporate in one ordinance the essential features of both, including the provision that the city may have the right to purchase the plant at its physical value after twenty-five years.

ONEONTA, N. Y.—The Home Telephone Company has acquired the lines of the Riverside Telephone Company, extending south through Otego, Unadilla and Sidney. The Riverside lines embrace about 700 telephones.

ELECTION.

HENDERSON, KY.—The following directors have been elected by the Henderson Telephone and Telegraph Company: R. T. Hickman, David Banks, Wm. Elliott, H. K. Cole, of Owensboro; W. G. Turpin, B. G. Witt and John Richgert.

BREESPORT, N. Y.—The following directors have been elected by the Breesport Telephone Company: Charles H. Kinley, I. A. Campbell, Harry

NEWS—WANTED

THE matter contained upon the Message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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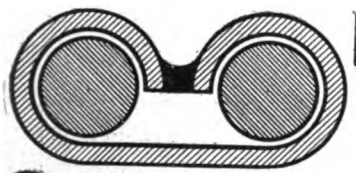
THE STANDARD "HEMINGRAY"

All With The

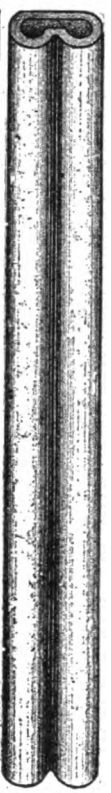
"Patent Drip Petticoats"

The Hemingray-Glass Co., Office, Covington, Ky. Factory, Muncie, Ind.

ESTABLISHED 1848



Cook Joint
BEFORE TWISTING



Perfect Contact

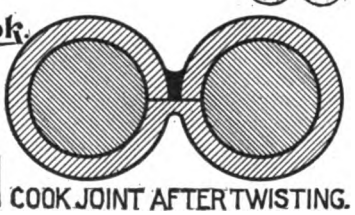
Means more than increased conductivity—it means longer life to the joint because corrosion can't take place.

COOK'S SELF-WELDING WIRE JOINT

makes a permanently perfect joint every time. Free Sample to show you.

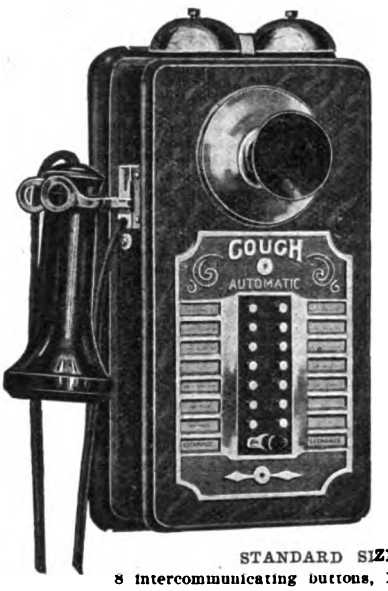
Frank B. Cook,

238 W. LAKE ST.
CHICAGO



COOK JOINT AFTER TWISTING.

THE TRUNK BUTTON



on the Couch Intercommunicating Telephone enables this system to do the work of a branch exchange without the services of an operator. This arrangement requires only two extra wires.

The Automatic Reset switch leaves the station in condition to be called after using.

Trunk Button — *Send for Catalogues*

STANDARD SIZES:

8	intercommunicating	buttons,	1	exchange	button
14	"	"	1	"	"
18	"	"	1	"	"
24	"	"	1	"	"
28	"	"	1	"	"

100% CHEAPER THAN BRANCH EXCHANGE.
100% QUICKER; 100% MORE SATISFACTORY.

S. H. COUCH CO., Inc., Manufacturers

162 PEARL STREET, BOSTON, MASS.

The UNIVERSAL

"FORGED STEEL"

Messenger Hanger

A STRONG, SERVICEABLE HANGER MADE IN THREE WEIGHTS. GALVANIZED OR JAPANNED

We Make Construction Specialties
Write for Catalogue

NORTON TOOL CO.
Electrical Dept.
WEST PARK OHIO

Mr. Manager: Are Your Books All Muddled Up and Collections Behind?

Send for our free Booklet and Catalogue about

Telephone Accounting and Filing Systems

DO IT TO-DAY!

N. B. Tell us the size and scope of your exchange or system. Send with letter sample sheets of the forms and records you are now trying to use, so that we can advise intelligently how to improve your present methods with our special copyrighted labor saving forms.

THE Edwards-Hine Co.

TELEPHONE SYSTEMATIZING DEPT.
5 and 7 PEARL STREET (EAST), GRAND RAPIDS, MICH., U. S. A.

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THE WEEK'S MESSAGES

B. Harding, Jesse Curtis, Edward M. Grady, S. G. Campbell and Hyatt Ross.

WALTON, N. Y.—The Home Telephone Company, of Walton, N. Y., has elected the following directors: Ralph Andrews, M. E. Combes, M. C. Lewis, of Hamden; Roderick Fitch, John Townsend, G. O. Mead and J. G. More, of Walton.

UPPER SANDUSKY, O.—The Upper Sandusky Telephone Company has elected the following officers: President, C. W. Hale; vice president, Gen. I. M. Kirby; secretary, M. H. Brinkerhoff; treasurer, J. J. Hulse; manager, C. D. Juvenal.

PERSONAL.

E. W. INGLIS is now manager for the Central Union Telephone Company at Cairo, Ill.

GEORGE E. HONNORS has recently retired after 27 years of active and successful telephone work in Gloucester, Mass. In 1880 he organized the first exchange of the New England Telephone Company at that place with only 65 subscribers. Since that time he has held the office of manager. As an official he was liked by all, and the news of his retirement was received with muh regret by his many friends in the city.

G. E. LEE, formerly of the Indiana contract department of the Central Union Telephone Company, has been appointed manager for that company at Portland, Ind.

GEORGE C. TREADWAY has recently been appointed manager of its exchange at Alton, Ill., by the Central Union Telephone Company.

MISCELLANEOUS.

KREMIS, PA.—The Union Telephone Company has recently installed a pay station at Kremis, Pa., connections being furnished to the Greenville Telephone Exchange and the Mercer Telephone Exchange, which have heretofore been without service.

SHERMAN, TEXAS.—The plant of the Grayson County Telephone Company has been put out of commission temporarily by a recent fire. The loss is estimated at $16,000, partially covered by insurance.

New Construction in the Field

BIPPUS, IND.—Many improvements are to be made in the system of the Bippus Telephone Company.

CHEROKEE, IA.—A new switchboard is to be installed by the New State Telephone Company, and the company also contemplates extensive improvements in its outside system.

LEHIGH, IA.—A new line northwest of Lehigh has just been completed by the Lehigh Telephone Company. Additional extensions and improvements will be made to the company's plant.

WAVERLY, IA.—The Corn Belt Telephone Company is building a new line to Waterloo.

PLAINVILLE, KAS.—The system of the Plainville Telephone Company is being entirely rebuilt.

WEST PENOBSCOT, ME.—Many improvements and extensions are being made by the West Penobscot Telephone Company, of West Penobscot.

MYERSVILLE, MD.—The Frederick and Middletown Electric Railroad has decided to construct a telephone line along the railroad between Myersville and Middletown.

LOWELL, MASS.—It is the intention of the Merrimack Valley Independent Telephone Company to commence work shortly on its system at Lowell, provided the validity of its recently acquired franchise is not disputed.

SHELBURNE FALLS, MASS.—The Deerfield Valley Telephone and Telegraph Company contemplates the construction of a line from Shelburne Falls to Jacksonville, Vt. Additional wires are also to be strung from Shelburne Falls to Charlemont.

HASTINGS, MINN.—The Twin City Telephone Company is stringing additional wires in Hastings, Minn.

MESABA, MINN.—The entire outside construction work of the Mesaba Telephone Company at Grand Rapids is to be rebuilt. Twenty-two thousand feet of cable and twenty-five thousand feet of insulated wire will be used in this work. New lines are to be built, a new switchboard installed and connections made with Deer River, Bovey and Coleraine. When completed the Mesaba Telephone Company will be in a position to give Grand Rapids the same quality of service that is enjoyed by Hibbing, Virginia, Eveleth and other Iron Range towns.

DOLGEVILLE, N. Y.—The Interstate Telephone Company is improving its system in Dolgeville by stringing a number of new cables.

WALTON, N. Y.—The city of Walton is to be equipped with a second telephone system at an early date. The Home Telephone Company, incorporated last February, and at that time granted a franchise by the board of trustees, will install the system. In certain portions of the city wires will be placed underground.

GRAND FORKS, N. D.—The Tri-State Telephone Company is constructing a line between Grand Forks and Thief River Falls. It is also building a line from Petersburg to Medford.

McVILLE, N. D.—A farmers' telephone line is being built by the farmers west of McVille. The line will probably be extended to Pekin and Tolna.

AKRON, O.—The Akron People's Telephone Company is erecting a new building, and is to install a new exchange.

NEW CASTLE, PA.—It is expected that the installation of the underground system of the Citizens' Telephone Company will be started at once.

PHILADELPHIA, PA.—The Keystone Telephone Company is increasing the equipment of its main exchange to its full capacity of 7,200 lines, to take care of its increased business from long distance lines recently absorbed by the company.

PITTSTON, PA.—Among the many improvements planned by the Consolidated Telephone Company, of Scranton, are the installation of a new switchboard at Pittston and the rebuilding of its system at that point.

TRANSFER, PA.—The work of installing its new exchange at Transfer has been completed by the Pymatuning Independent Telephone Company. Connections have been established with the Union Company's exchanges at Greenville and Sharpsville, and it is the intention of the company to build lines throughout the entire township.

READING, PA.—The Consolidated Telephone Company of Reading, Pa., is constructing lines in Wyanessing and also expects to extend its lines to Womelsdorf, with connections in all directions.

CLEAR LAKE, S. D.—The lines of the Clear Lake Telephone Company are to be extended in the northern part of the county. The first line will be built to Bemis, and from there to Altamont and on north.

GROTON, S. D.—The Groton Telephone Company has under construction lines north of Columbia.

SPRINGS, S. D.—The Springs Mutual Telephone Company is constructing its system at Springs, S. D.

CLEBURNE, TEXAS.—The Cleburne Telephone Company is to install a complete fire alarm service at Cleburne.

SEATTLE, WASH.—Construction work on the long distance lines of the Independent Telephone Company, of Tacoma, is to commence at once. Work will be begun at Port Ludlow, and lines will extend through Port Townsend and Port Angeles.

WALLA WALLA, WASH.—A new telephone system is to be installed at Walla Walla by the Home Telephone Company, of Portland, Oregon. The wires and cables will be laid in underground conduits in the business portion of the city, but will be strung on poles farther out in the residence district. Work on the installation of the system is to commence at once.

HUNTINGTON, W. VA.—The U. S. Gas Company is constructing a telephone line from Huntington to the Roane County gas fields.

MANITOWOC, WIS.—The Manitowoc and Western Telephone Company, which recently increased its capital stock from $2,500 to $25,000, is to spend $12,500 in improving its system. Chief among these improvements will be the construction of a line to Greenleaf, Brown County, and numerous small branches to the surrounding country.

MONROE, WIS.—The United Telephone Company, Monroe, Wis., will build a line to Five Corners, and will also make material improvement in its systems at Blanchardville and Monticello. Connection will be made with farmers' lines at Clarno.

NORWALK, WIS.—The Monroe County Telephone Company is constructing a line from Norwalk to Ridgeville.

RACINE, WIS.—The Citizens' Telephone Company is placing some new cables underground in Racine.

SHULLSBURG, WIS.—A telephone line is being built from Darlington to Shullsburg by Fred Hilary of Shullsburg.

UNION GROVE, WIS.—The Union Grove Telephone Company contemplates the reconstruction of its entire system.

LARAMIE, WYO.—The Independent Telephone Exchange at Laramie is to be entirely rebuilt. The company also has under consideration the construction of a line to the camp at Crow Creek.

CHATHAM, N. B., CAN.—The Central Telephone Company is building a new line between Chatham and Campbellton.

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Track Telephones on the Bavarian State Railroads

By Dr. Alfred Gradenwitz.

ALL the lines of the Bavarian State Railroads, comprising full gauge railways about 3,957 kilometers in length, have been in the course of the last few years equipped with track telephones, the aggregate number of telephone instruments being about 2,900. To this imposing total should be added the secondary or narrow gauge railways, 2474 kilometers in length, along the lines of which no less than 760 telephones are permanently connected, and in addition to these there are the portable instruments, of which each train of these railways contains one, in addition to two to these instruments installed at the headquarters of the Railway Department and one with each locomotive station. Portable telephones are furthermore used to a limited extent by the State railway engineers in connection with any extensive rail reconstruction, bridge repairs, etc.

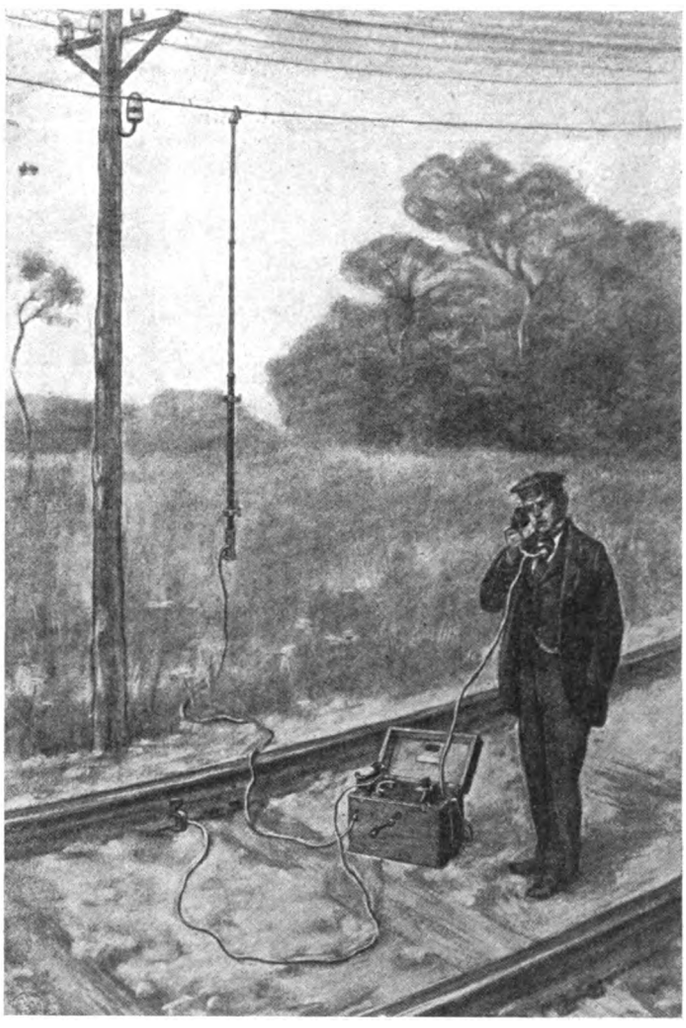

Fig. 1. Workman using track telephone.

In choosing the most available telephone system, the possibility of connecting a portable apparatus to any point of the free track had to be accounted for. This condition is met most perfectly by the American parallel grounded line system, or as it is called by the Bavarian Railway Department, the "Half Parallel Connection System," designed by Carty. The principle this system is based on is the connection of each instrument between a single wire and ground, as illustrated in Fig. 2.

The grounded telephone instrument T, one of which is installed at each of the talking posts 1 to 7, are connected to the continuous telephone line by means of simple connecting wires. As each talking post should be able to communicate efficiently with any other post, the resistance and self-induction of the alarm bells should be very high as compared to the resistance of the line which, in turn, should be as low as possible.

As regards the possibility of disturbances, only the risk of a ground connection, endangering the operation of all the apparatus comprised in a given circuit, has to be accounted for, while any other disturbances exclusively effect the working of the apparatus in question.

The first experiments on the above system were made on a telephone line installed on the

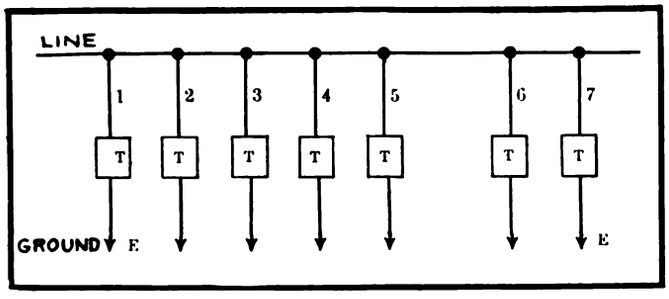

Fig. 2. Schematic of connections—all telephones legged from line to ground.

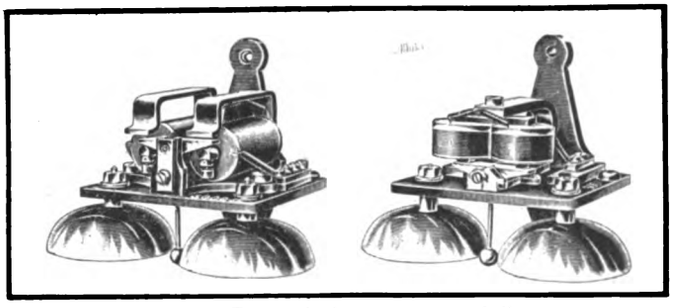

Fig. 3. Types of alternate current bells.

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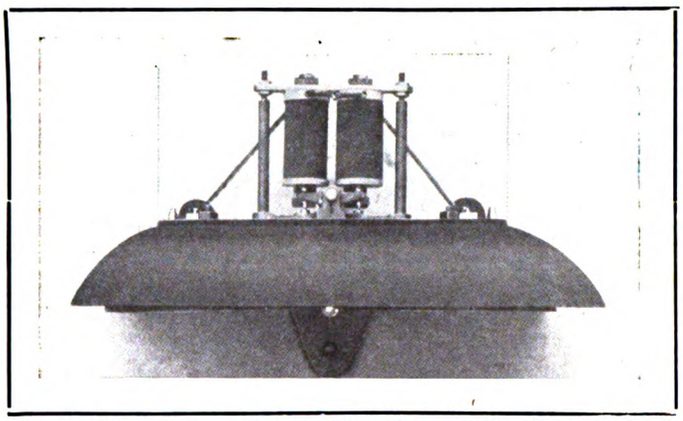

Fig. 4. Alternate current alarm bell used on outside of guard's house.

Mittersendling-Grosshesselohe Railway line which was equipped with a calling line containing the alarms and a talking line containing the telephones in series. The results of these tests having been extremely satisfactory, especially as regards the purity of transmission, the system was definitely adopted, the installation showing the following arrangement:

An independent set of poles carrying a copper wire 2 mm. in thickness was installed alongside the track on the side opposite to the telegraph poles, the height of the wire from the ground being about 4 meters and correspondingly greater in the stations and viaducts. The line wire is at each talking station branched off to the telephone apparatus by means of a single copper wire. The ground connection is effected by large iron plates 1 sq. meter in area, showing a resistance as low as possible.

The telephones are of very substantial construction and are enclosed in polished cherry wood casings. The lid carrying only the transmitter and the generator button, ensures an easy access to all such parts as are fitted in the casing. The generators are provided with four substantial magnets, armatures 600 ohms in resistance and will give an average of 150 volts when turned at the rate of 2 revolutions per second. The instruments are provided with a telegraph key by means of which characteristic calling signals may be given out most effectively. The automatic hook switch points have platinum contacts, the primary and secondary circuits being separated, in order to allow any disturbance in either to be readily located. The

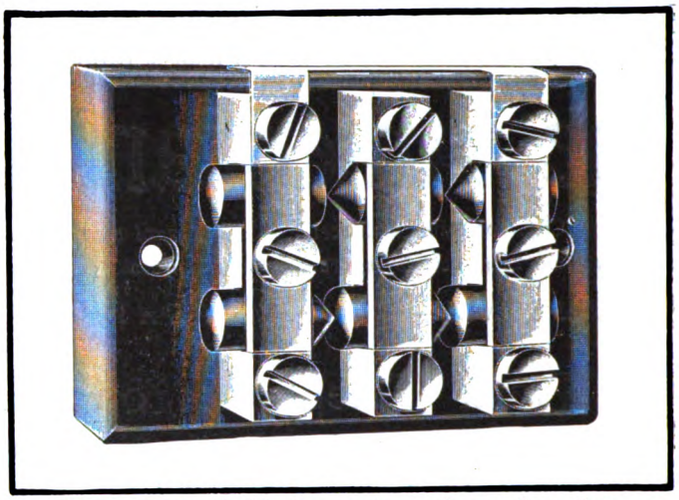

Fig. 7. Form of lightning arrester used on railway lines.

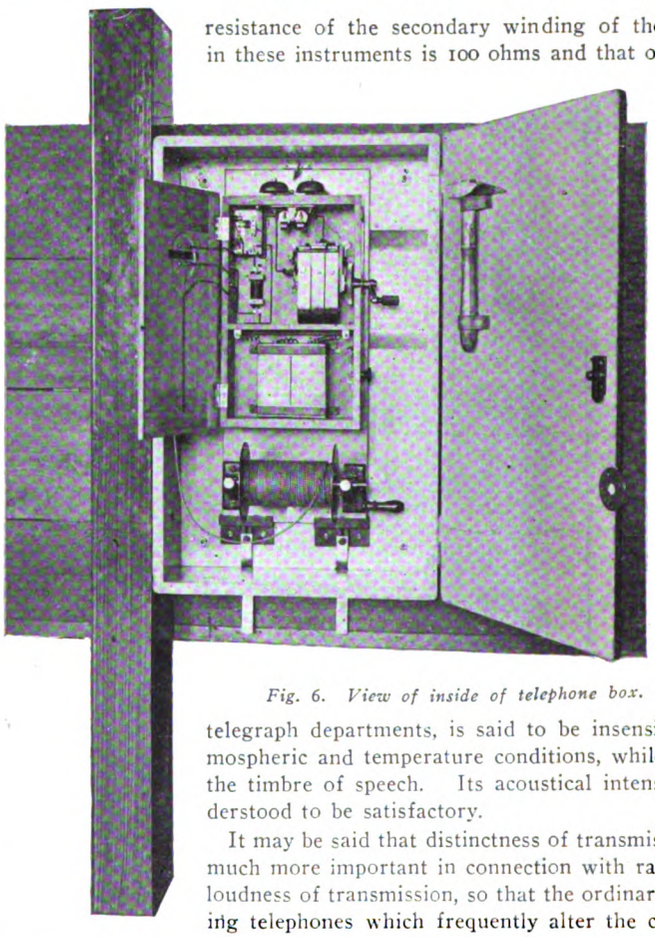

Fig. 6. View of inside of telephone box.

resistance of the secondary winding of the induction coil used in these instruments is 100 ohms and that of the primary .5 ohm.

The transmitter is constructed on the multiple-contact system, comprising a wooden membrane located between rings of para rubber and on which 3 thin vertical carbon strips have been fixed. To these carbon strips are applied 16 carbon cylinders located in two carbon blocks bored out underneath. This transmitter, designed by S. Reiner, of Munich, and which has been adopted by many railway and telegraph departments, is said to be insensitive in regard to atmospheric and temperature conditions, while perfectly preserving the timbre of speech. Its acoustical intensity, moreover, is understood to be satisfactory.

It may be said that distinctness of transmission is a desideratum much more important in connection with railway telephones than loudness of transmission, so that the ordinary types of loud speaking telephones which frequently alter the character of the voice

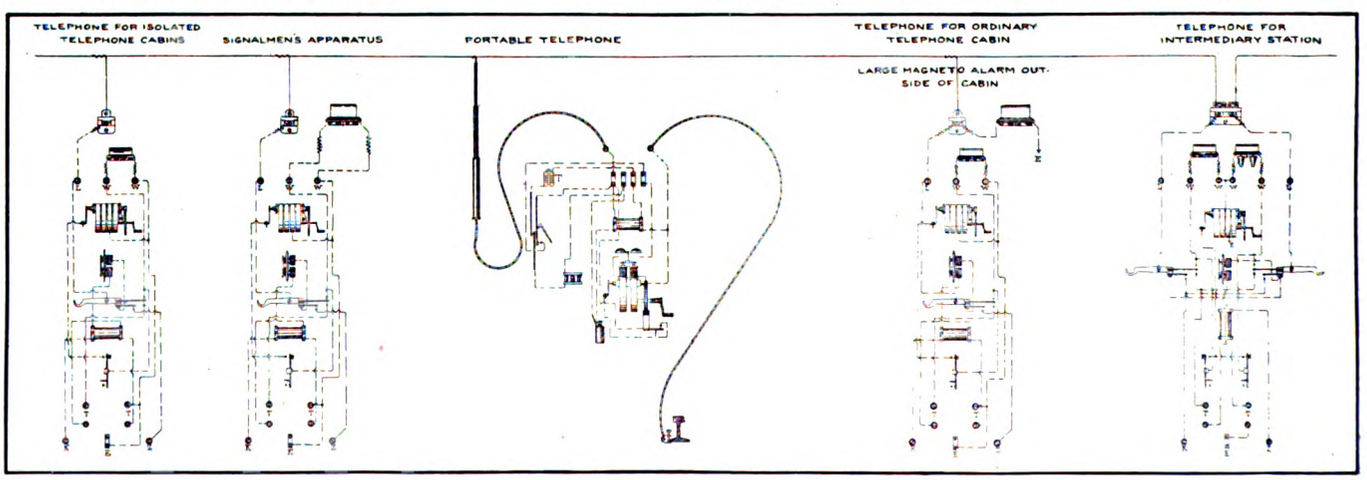
TELEPHONE FOR ISOLATED TELEPHONE CABINS
SIGNALMEN'S APPARATUS
PORTABLE TELEPHONE
TELEPHONE FOR ORDINARY TELEPHONE CABIN
LARGE MAGNETO ALARM OUTSIDE OF CABIN
TELEPHONE FOR INTERMEDIARY STATION

Fig. 5. Schematic diagram of wiring of sets for different locations.

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should be strictly excluded from this field of application.

Whereas the telephones installed in the signalmen's cabins and in the telephone cabins only have one automatic telephone hook lever, those installed at the end of each line are equipped with two automatic levers, two small magneto bells and two switching keys serving to give an alarm in either direction. The calls coming from the two directions respectively are distinguished by using bells of different pitch. A plate lightning-arrester (Fig. 7) with a removable foundation plate is fitted to complete each telephone instrument. The telephone casing proper is attached to a backboard provided with a small writing shelf and carrying also a battery box for two Leclanché cells.

Another important part of these track telephone plants are the portable telephones (Fig. 1), which as a rule are carried permanently only by narrow gauge railway trains, but are also added to the equipment of ordinary trains on special occasions. These instruments, which are most readily connected to any point of the line, may be operated by anybody without any skill or experience such as is needed to use a telegraph instrument, while their relatively great resistance against atmospheric influence and rough handling are other good points.

The main parts of these telephones are fitted in an oak casing, a substantial leather belt being provided for carrying the apparatus. The casing is provided with a movable lid and contains a combined transmitter and receiver, a magneto generator provided with a removable crank, a bell, 2 dry cells and a winch on which the conductor cord is wound. In case a special ground connection is wanting, the rail may be used in its place, attachment being made by means of a clamp. The apparatus further comprises an extensible connection rod consisting of three brass tubes. The upper end of this rod carries a hook and the lower end a wooden handle. A conductive cord 4 meters in length and terminating in a contact is wound alongside this rod. The portable telephone apparatus is connected to the track telephone line by opening the lid of the casing, lifting the winch, screwing the connection clamp either to the rails or to any convenient part of a car and placing the generator crank in position. After next drawing the connection rod out to the required length, the conductor cord is unwound, the rod is connected to the line, while moving the hook is moved to and fro in order to clean the wire, and the contact is inserted into the aperture of the front walls of casing of the instrument, connecting it to the line.

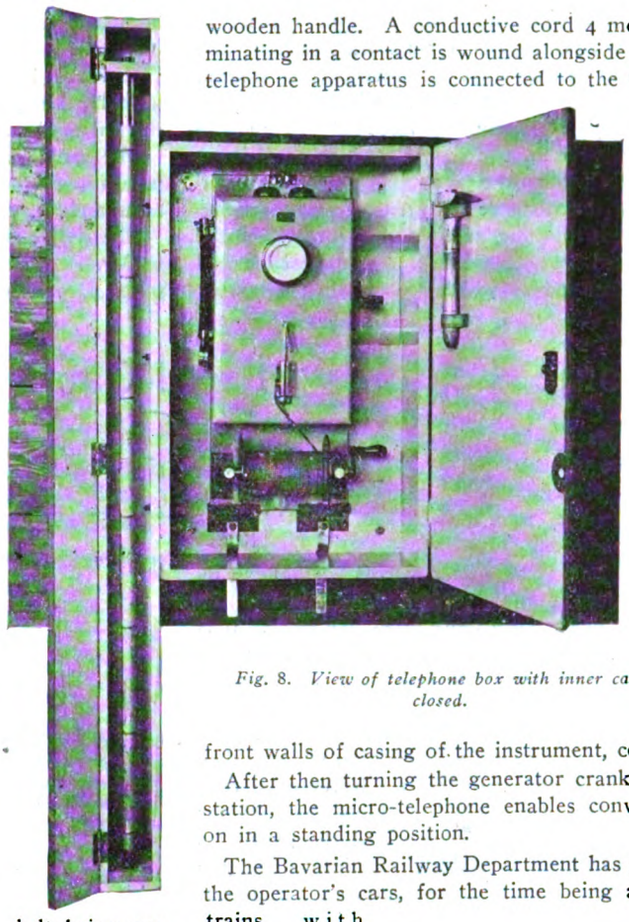

Fig. 8. View of telephone box with inner case closed.

After then turning the generator crank to call up the desired station, the micro-telephone enables conversation to be carried on in a standing position.

The Bavarian Railway Department has just decided to provide the operator's cars, for the time being at least in the express trains, with special telephones fitted into the cars. These telephones, which are illustrated in Figs. 6 and 8, possess a special (patented) connection system enabling the whole of the circuit from the connection hook to the ground connection to be tested by means of a pressure button. This test is carried out by the guard before the train starts. The connection rods are of bamboo and while comprising no current conducting parts are connected only to the hook which is solidly connected to the conducting cord. The ground connection is a double

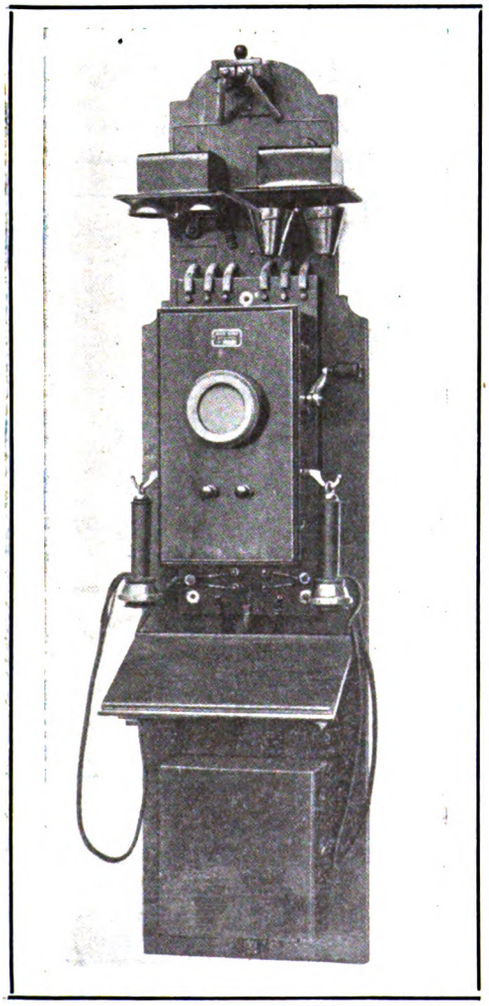

Fig. 9. Track telephone for stations.

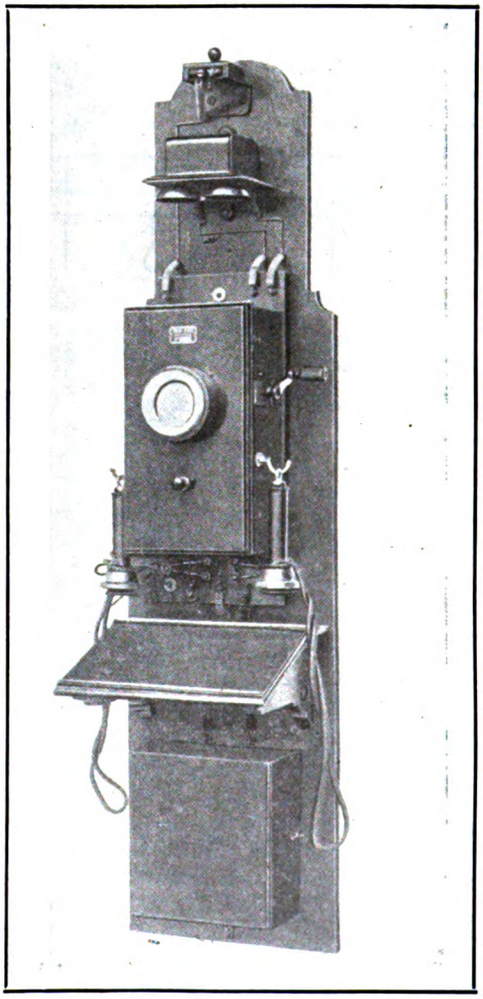

Fig. 10. Style of instrument used by signal men.

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one and is permanently secured upon the metallic car truck.

In Fig. 5 is shown a wiring diagram for a track telephone line comprising an instrument intended for an intermediary station, one for an ordinary and one for an isolated telephone cabin, a portable telephone, and an instrument intended for railway signalmen's cabins exceeds the limit of 2.15 kilometers, an isolated in corrugated sheet metal cabins, the large magnet alarms being fitted outside. In case the distance between any two railway signalmen's cabins exceeds the limit of 2.5 kilometers, an isolated telephone cabin is inserted between the two. Both these isolated telephone cabins and those cabins which are installed wherever necessary near abandoned signalmen's posts contain a telephone including a small signal bell and two dry cells. All the telephone cabins are kept enclosed and locked to prevent meddling by unauthorized persons, but are accessible to the railway officials by the aid of the compartment key.

The cost of installing the track telephone plant above described, inclusive of the telephone poles, the apparatus, ground connections and any accessories, was 300 marks ($45) per kilometer.

The writer is indebted for the particulars given in this article to Mr. A. Neumayer, telegraph manager to the Bavarian Telegraph Department.

Some Features of All-Cable Distribution*

ALTHOUGH it has such important advantages in some respects the all-cable plan has two vital features that are objectionable; the breaking down of the insulation of the rubber covered twisted pair drop wire, and the numerous taps necessary. These two features will be worked out. The wire companies will have to, and no doubt will, produce a more perfect insulation, and the cable manufacturers will bring out a more accessible cable. It is a business proposition to both. With these two points out of the way the demand for twisted pair wire and cable would grow enormously, and it is a business proposition to the manufacturers to do what they can to contribute to this demand. Furthermore, telephone companies are facing all-cable distribution whether they want it or not. The end of poles suitable for heavy open construction is rapidly coming into sight. Suitable material for cross-arms and pins is getting very scarce, and the enormous growth in toll line construction is making vast inroads on the pole, cross-arm and pin resources, and the day is not far distant when it will be necessary to set aside and save these materials for tall work, and cable distribution will take a fresh impetus. In dwelling on some of the points in favor of all-cable work in the preceding passages there were overlooked two very important points, which are of interest. In the all-cable plant it is possible to have only one connection from main frame to the sub-station protector. Also the salvage in an all-cable and twisted pair rubber covered copper distributor is at least 30 per cent. as against practically nothing in the open wire system.

The specifications for the proposed new method of cable distribution, in their tentative form are as follows:

This will be a combination of direct and multiple in small units.

No multiple shall exceed 10 pair except by direction of Engineering Department.

Cable shall be assigned in "blocks" of 50 pair. The term "block" will be technical name for an assignment of 50 pairs and such a block may be 50 feet or 5,000 feet in length.

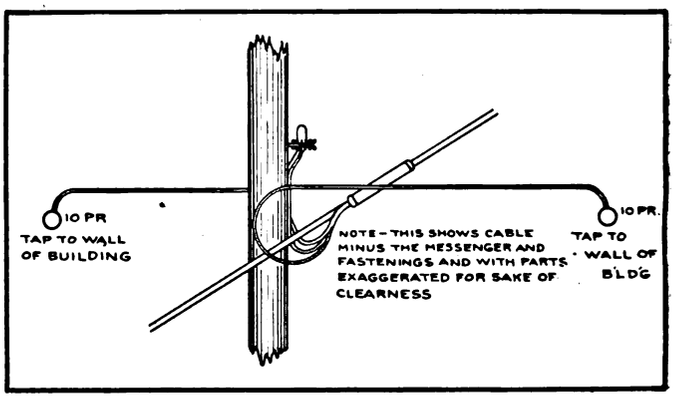
10 PR
TAP TO WALL OF BUILDING
NOTE - THIS SHOWS CABLE MINUS THE MESSENGER AND FASTENINGS AND WITH PARTS EXAGGERATED FOR SAKE OF CLEARNESS
10 PR.
TAP TO WALL OF BLDG

Fig. 3. Method of tapping cable to serve territory in small units.

If distributed in 10 pair taps, this will give four taps of 10 pair each, direct, leaving 10 pair to multiple through all four taps.

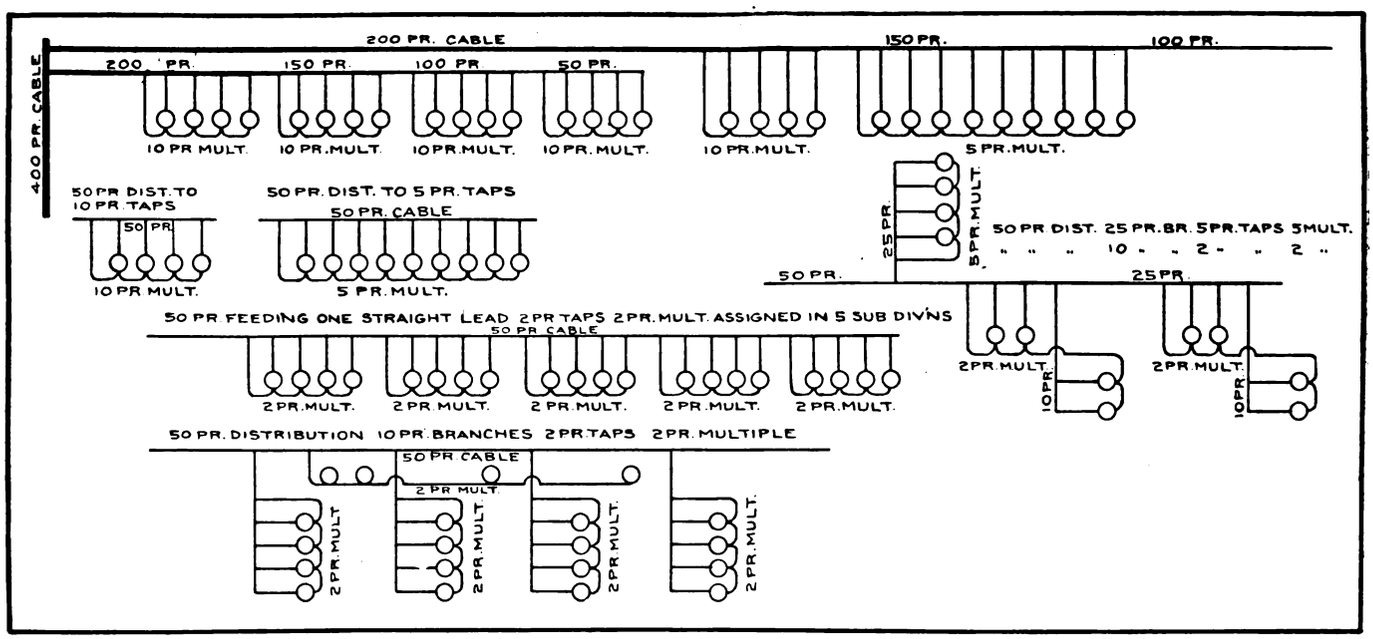

Fig. 2. Example of 10-5-2 pair taps from main or branch cables.

If for 5 pair taps, this will give 9 taps of 5 pair direct, leaving 5 pair to multiple through all nine taps. (See Fig. 2.)

If for 2 pair taps, the block shall subdivide into 10 pair sections or branches; this will give 4 taps of 2 pair each direct, leaving 2 pair to multiple through all 4 heads to each section. (See Fig. 2.)

The present form of cable pole construction and equipment shall be discarded for general practice, and a combination con-

*Continued from the issue of September 1.

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sisting of a steel distributing ring, weatherproof pothead and pothead bracket will be substituted. (See Fig. 1.)

Distribution from this ring to subscriber will be by means of twisted pair No. 14 okonite.

Cellar distribution shall be used wherever practicable or permission of property owners can be secured.

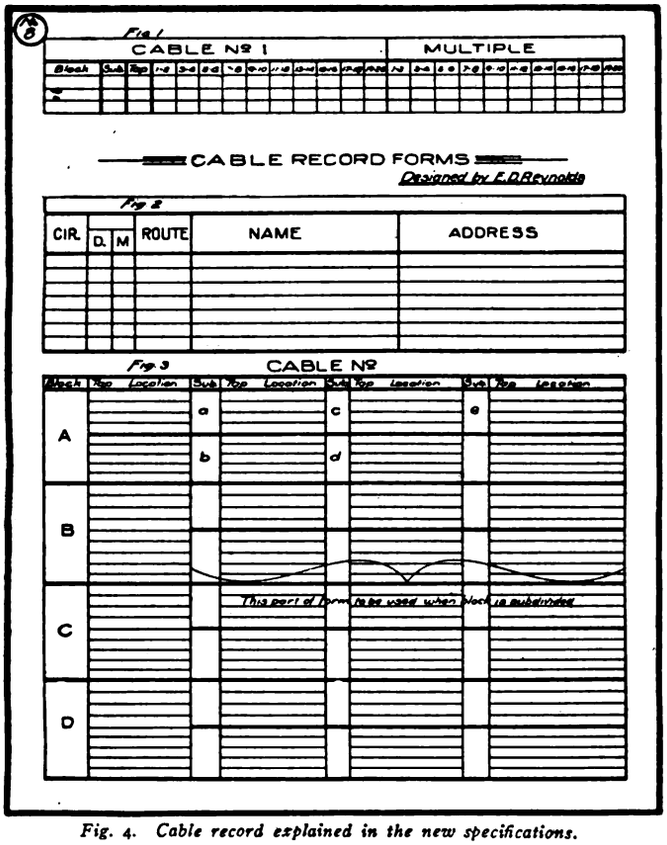

Fig. 4. Cable record explained in the new specifications.

Fence distribution may be used in such cases where it might prove desirable or practicable.

(a). In block wiring paper core cable laid out and tapped out as outlined above shall be used, and very long runs of okonite in bridle rings will be discontinued.

(b). The necessary runs of open wire from taps to subscriber shall be made with lead encased, paired wire, and unprotected okonite will be discontinued.

Where concentration of business would demand more than the maximum 10 pair head, tap the feeder cable out in small branches to walls of adjacent building and treat as in block wiring on a small scale, each tap carrying its own individuality.

4.) This will be made possible by proper engineering at the installation of the cable by providing sufficient excess of cable wires in congested districts.

At each head or tap, the direct lines will be placed on the top side of the distributing ring and the multiple shall be placed on the underside and be plainly marked "M."

If at any point, it should be necessary to use open wire, the top arm or arms shall be considered as the direct and the multiple shall be underneath. Multiples will always be of the same unit as the direct at each head, except for reasons given in clause 27 elsewhere in these specifications.

Example:

50 pair distributed 10 pair heads—10 multiple
50 " " 5 " " — 5 "
50 " " 2 " " — 2 "

Multiple shall only be used for party lines and for overloaded poles.

To correctly assign cable, "Spot" maps must be made of each plant before cable is planned.

In congested districts the Engineering Department will assign cable sufficient to take care of excess business and on a ten pair pole may be handled two ways, as follows:

The wires may be left dead in the cable or dead stubs of 10 pair each may be brought out and left to extend to nearby building walls as hereinbefore specified. In either case, they will be assigned their prospective number and placed in the records as such. This is to keep records, locations, etc., in sequence as much as possible.

Each cable leaving the office will assume a permanent number not duplicated again. Each cable will drop off in blocks or units of 50 pair, stepping down in size, till used up.

Each block will assume a letter of the alphabet and subdividing into ten 5 or 2 pair taps and these taps assuming numerals in sequence the individuality of a certain tap will thus be established.

Example:

1A4, which would mean head No. 4, block A of cable No. 1.

In distributing a 50 pair lead into 2 pair taps, the 50 pair shall first be subdivided into 10 pair sections, taking a letter of the alphabet in addition to the block letter of the main division. Thus, 1AA4, meaning head No. 4, a division of block A, cable No. 1, or 1AB4, meaning B division of block A, and head No. 4.

All of the preceding data will be recorded in a very simple form of location and information concerning cables, taps, pins and street addresses, etc. (See Fig. 8.)

Cable taps shall be located by street address nearest taps.

In all records dealing with pins or pairs, a separate ruled column will take care of the multiple.

For county or country work through cable of required capacity will be carried to suburbs and there opened into 25 pair boxes, equipped with fuses and carbons and without multiple.

For isolated communities of subscribers in subdivisions, park additions, etc., of large cities, a through cable shall be carried

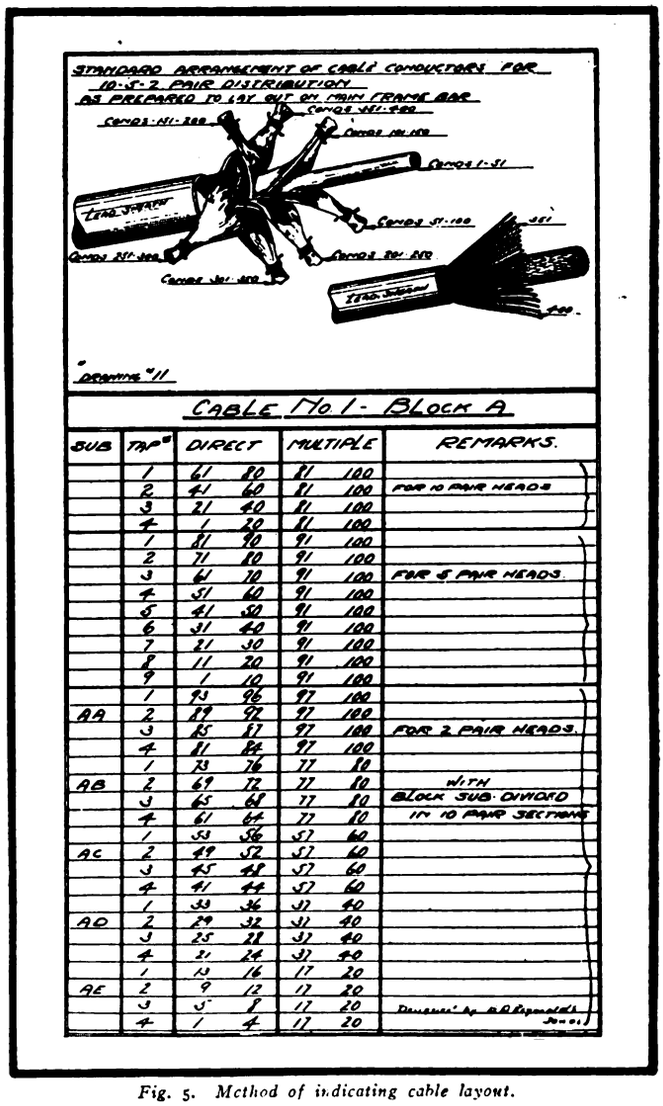

Fig. 5. Method of indicating cable layout.

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to a convenient distributing point and from there radiating in branches and taps as hereinbefore outlined.

The term "block" shall not apply to less than 50 pair and shall be used in connection with the divisions of the main cables.

Each cable installation shall be engineered by the head office to suit the case, as indicated by "Spot" maps and data furnished by representatives.

If by reason of peculiar conditions, any one street be hard to properly lay out for either 10, 5 or 2 pair heads and suggest rather an irregular use of all three, a common multiple shall be decided upon by the engineers and carried through all heads of whatever direct unit.

In crowded districts or those where conditions are uncertain, but rapid growth seems certain, the engineer shall carry 200 pair cable to the end of its distributing capacity, instead of stepping down in size with the finish of each block; if in his judgment,

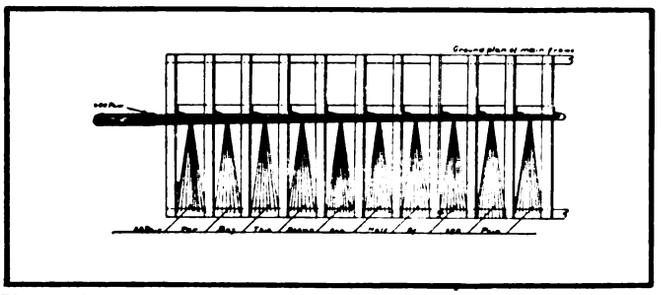

Fig. 6. Proposed method of fanning out cable on main frame for new plan of distribution.

this would save enlarging capacity on the ends of that section by stringing more cable in the near future.

In mapping out cable, due notice shall be taken of the transmission problem and gauge of cable governed accordingly.

Every pole bearing a cable head shall be plainly marked with its own number—block letter and cable number.

It shall not be necessary in the beginning to make of every pole a cable pole. Space in cable and location on records will be assigned but only such heads as are needed will be opened.

For methods of handling twisted pair house drops, see Fig. 7.

These specifications cover this work as a method and are not fixed or arbitrary. Every plant shall be given what that plant requires, the proper authority shall say how much shall be done, and these specifications will cover how to do that much. The above specifications are general and for use of engineers only.

Following this will be found detail or subsidiary specifications.

ASSIGNING CABLE INTO BLOCKS.

If beginning with 400 pair.

The shortest block shall be	350 to 400
2nd in length " "	300 to 350
3rd " " " "	250 to 300
4th " " " "	200 to 250
5th " " " "	150 to 200
6th " " " "	100 to 150
7th in length shall be	50 to 100
8th " " " "	1 to 50

ASSIGNING BLOCKS INTO HEADS.

If for 10 pair heads.

Tap No. 1 pairs	61 to 80
" 2 "	41 to 60
" 3 "	21 to 40
" 4 "	1 to 20

Multiple common to all 81 to 100.

ASSIGNING BLOCKS INTO HEADS.

If for 5 pair taps.

Tap No. 1 pairs	81 to 90
" 2 "	71 to 80
" 3 "	61 to 70
" 4 "	51 to 60
" 5 "	41 to 50
" 6 "	31 to 40
" 7 "	21 to 30
" 8 "	11 to 20
" 9 "	1 to 10
Multiple pairs	91 to 100

For distributing a block of 50 pairs into 2 pair heads where it does not branch, it is thought best to subdivide, both for convenience and for getting a larger amount of multiple in the total length. Subdivision in groups of 10 pair will bring this about, and wires shall be assigned as follows:

Take Block "A" for example:

Aa—Tap No. 1 pairs	93 to 96
" 2 "	89 to 92
" 3 "	85 to 88
" 4 "	81 to 84
Multiple	97 to 100
Ab—Tap No. 1 pairs	73 to 76
" 2 "	69 to 72
" 3 "	65 to 68
" 4 "	61 to 64
Multiple	77 to 80
Ac—Tap No. 1 pairs	53 to 56
" 2 "	49 to 52
" 3 "	45 to 48
" 4 "	41 to 44
Multiple	57 to 60
Ad—Tap No. 1 pairs	33 to 36
" 2 "	29 to 32
" 3 "	25 to 28
" 4 "	21 to 24
Multiple	37 to 40
Ae—Tap No. 1 pairs	13 to 16
" 2 "	9 to 12
" 3 "	5 to 8
" 4 "	1 to 4
Multiple	17 to 20

(*Continued on page* 160.)

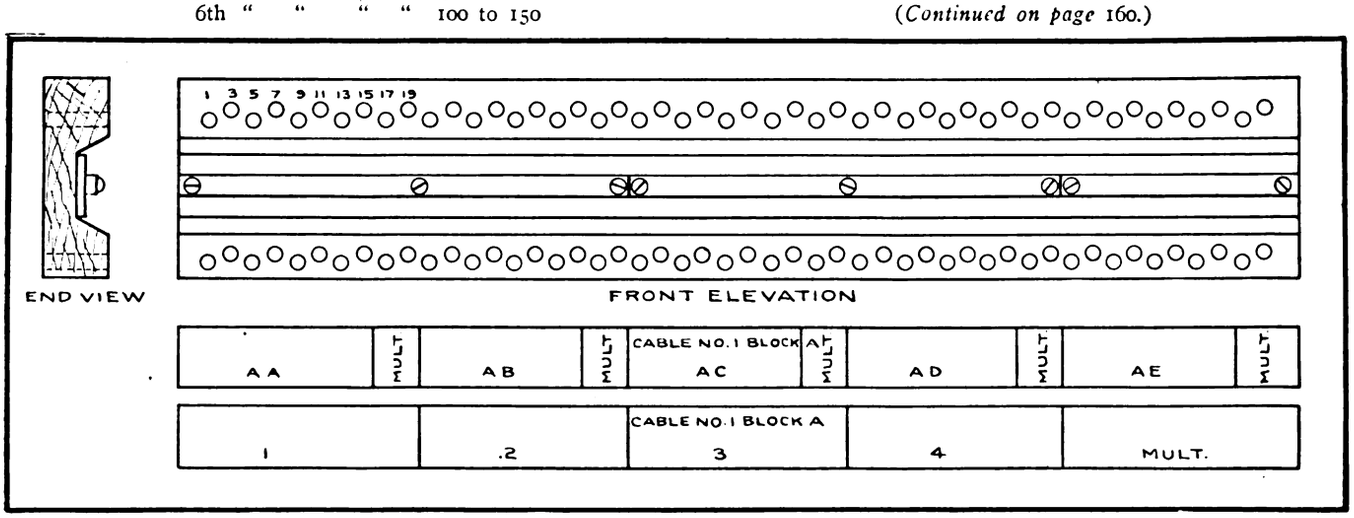

Fig. 7. Proposed method of marking main frame for 50 pair block distribution in 2 pair heads.

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QUERIES

CLEARING NOISE BY RINGING.—(762.)

After storms we frequently have a little noise on some of our country lines, which after a time clear themselves. We find that sometimes a line which is noisy clears up immediately after our operator has rung on it. This occurs so often that it cannot be a mere coincidence. Does ringing discharge the line in some way? If not, what is the explanation for this phenomenon? B. G.

While a storm is in progress sparks often pass across the gap between the carbons of arresters, even on lines which are not seriously disturbed by lightning shocks. This is due to the fact that lines become heavily charged, and when lightning strikes near them the static charge which has accumulated on the wires becomes released and seeks the shortest path to ground. The passage of the spark causes very small particles of carbon dust to fall into the gap between the blocks and these partially ground the line, making it noisy. Ringing on the line will very often remove these particles. It should always be resorted to in small exchanges as it may clear a line when it would otherwise be necessary to send out a man to clean the carbons.

TRANSPOSITIONS.—(763.)

I contemplate building two toll lines, one to be a No. 12 copper circuit, the other a No. 12 iron E. B. B. which will be on same pole route for about 13 miles. The lines are to be built on 25 ft. poles for 13 miles, using 6 pin arms, pins 3 and 4 being taken by the copper circuit and pins 5 and 6 by the iron wires. I do not expect to ever use any more arms on these poles and don't look to have to use pins 1 and 2 for some years. Only these two circuits are to be on pole route. There are to be 32 poles per mile. Enclosed you will find a diagram of the line (Fig. 763-b). Please tell me how many transpositions per mile or how many for total 13 miles and how divided while the two circuits are on same pole line and after leaving main pole route how many per mile for the copper circuit. C. F. L.

The accompanying sketch, Fig. 763a, shows an economical and effective method of transposing your toll lines between points A and B or throughout the distance over which both lines run on the same poles. This method provides for the transposing of each circuit against the other and, incidentally, against a third circuit, or any foreign circuit which may be introduced. It necessitates that each circuit be transposed only once in two miles, a total of twelve transpositions, one every mile for thirteen miles.

If at any time a third circuit is placed on the same cross-arm, it will be found to work entirely satisfactorily if it is not transposed at all throughout these thirteen miles or any portion thereof.

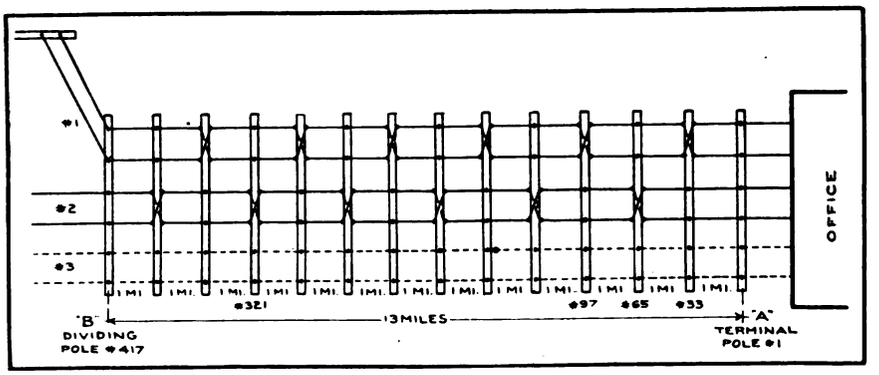

Fig. 763a.

Since there is no foreign circuit parallel to your toll line beyond the dividing pole No. 417, no transpositions are necessary beyond this point until another circuit is placed.

NOISE FROM RINGING MACHINE.—(764.)

We have two ringing machines, one run from electric lighting current and the other from the exchange storage battery. When the exchange was first installed we had no trouble, but now whenever we run the ringing machine on the battery we get a noise on all our lines. As the same ringing circuit is used from the power board as is taken by the other machine we are unable to see how the second machine could bring on any induction. Can you suggest any way to clear the trouble? V. R.

The fact that your other machine does not produce a noise seems, as you suggest, to remove any possibility of the trouble being due to induction. In any event this would hardly cause a noise on all the lines. It is far more likely that there is some fault in the motor armature of the ringing machine which causes a fluctuation of potential at the battery terminals. The commutator should be carefully examined, and if not in good shape should be smoothed up, and the brushes carefully adjusted to bear evenly and without too much pressure. If this does not clear the trouble it is still likely to be found in the machine. A short circuited armature coil would be almost certain to bring on a noise, and the armature should be examined and tested to see if this condition is present. A short circuit might be caused either by some metallic connection between the commutator bars independent of the wiring, or by a defect in the coil itself, which could be best repaired by the manufacturers of the machine.

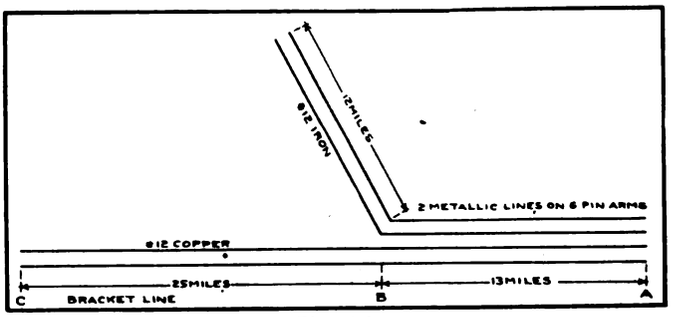

Fig. 763b.

NOISE FROM FOREIGN CIRCUITS.—(765.)

We are compelled by the city to allow the electric light company to run on our poles, and in order to prevent noise will have to change our transposition plan. It would be cheaper to transpose the electric light circuit, and we would like to know if we could work out a plan and present it to that company. If we could be sure that it would work we should be glad to stand the expense of transposing their circuit instead of ours. R. F.

One of the difficulties in the way of this plan is that there is no satisfactory insulator on the market for making transpositions in wires such as are used by electric light companies. Cutting of the wires is to be avoided as much as possible, and for these practical reasons you would be likely to meet considerable objection from the electric light people.

Even if they were willing that you should transpose their line it is hardly possible that you would do away with noise. The lighting circuits are seldom balanced as well as they should be, and any imperfection in this respect would show up very strongly on your lines. That is to say, if more current flows through one side of the electric light circuit than the other, due to grounding, this variation is so great that it will more than offset any advantage gained by transposing. If you transpose your own lines properly you will have a condition which will do far more to prevent noises from an improperly balanced lighting circuit.

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THE EDITOR'S PAGE

USING THE SPARE MOMENTS.

MANAGERS of telephone exchanges find that demands for telephones vary to a certain extent from time to time, and this introduces more or less complication into methods of carrying on routine work. The number of men in the installing force must be sufficiently large to carry on their work easily when the requirements are heaviest, and consequently, in almost every month, there must be a few days when some members of this group are unable to go about their regular occupation. The business-like head of the telephone company is anxious that on these days, as well as on others, a proper return shall be rendered for expenditures in the form of wages.

In directing affairs in such a manner as to secure profitable results from these men the foresight and ingenuity of superior officers find some of their most valuable opportunities. The object which the far-seeing man has in view is not only to keep his men from falling into the sin of idleness, but to so utilize their energies as to increase the value of his service and decrease his maintenance costs. If successful in the first he makes it possible to increase the amount of business done by his exchange, and the second produces, in a different way, an effect upon dividends which is no less pleasing to stockholders and directors.

The scheme of having each employee keep a "suggestion book" or memorandum is a very good help in planning for these slack days. Frequently men sent out to clear trouble find that it would be very desirable to make changes in wiring at some of the stations which they visit. This is especially true where the smallness of the force and the severity of the demands made upon it at times make it impossible to have every instrument installed by an experienced and trustworthy employee. Troublemen are quick to detect deficiencies, but seldom have time to remedy them if they require extensive changes. Then, too, experience shows a lack of readiness on the part of a great many employees on this class of work to take up and straighten out minor defects in the workmanship of the men in another department. It is far better, from almost every point of view, to have things put in first class condition by the men actually responsible for any unworkmanlike wiring which may be found. If reports are handed in corrections can be made during leisure hours in a way which enables discipline to be kept up to a high standard, and this is accomplished at a comparatively trifling expense.

In the exchange itself opportunities are almost unlimited. Upon the instruments kept in stock there is almost always some chance to put in a little work. Sets which have been removed can be polished up to look like new telephones, trifling adjustments which have been overlooked in the factory can be made, and material prepared for rapid work when there is a sudden call for new installations. In many places there is far too little tendency on the part of those in charge of work to inspect the outfits of tools and material used by subordinates. Poor tools are often responsible for work that is poorly done, and always cause slowness. A few minutes spent upon putting things in order, sharpening shears and cutters, and shaping up and tinning soldering coppers is likely to make it possible for each man to put in an extra telephone in a day. This is the sort of work that counts for as much as any other.

In the stock room systematic arrangement and order should be enforced, and every attention paid to securing arrangements which will make it possible to take out whatever is required on an instant's notice. The necessary work to maintain material in this condition can easily be undertaken by the installing force.

The operating, power and terminal rooms should always be kept in such a condition as to make a good impression upon visitors. A keen eye can always detect wires and cables which can be straightened out, metal which needs polishing, or dirt which can be removed. The instrument installer regards a chance to work upon this part of the equipment of his exchange as an opportunity to learn things which may lead to promotion, and is eager to take them up. It is well to take advantage of this spirit in a way which will be good for the men and the company alike.

All these things relate to the use of spare time in the larger quantities. Each day has its minor demands. If the work can be laid out for each man early in the afternoon of the previous day it gives a chance to save anywhere from a few minutes to an hour on the morning's start. When a man comes in half an hour early at night there is little for him to do if he does not know what will be required of him on the following day. If he has this information he can prepare his material, and be on the ground at the time he would otherwise be leaving the exchange. All these are in the nature of little things which, if properly done, make an astonishing saving by the end of a year.

THE FOREIGN AWAKENING.

THAT America leads in the manufacture of telephone apparatus and the operation of telephone systems is widely known and generally admitted. So far ahead is it in development and the use of the telephone that in comparison the combined systems of all other countries in the world make but a poor showing. That this condition will always continue, however, is not for a moment to be believed.

Now there are signs that throughout many countries the enormous value of this great time-saving method of communication is becoming appreciated. The governments which control the systems of communication in Europe are beginning to see how slow is the telegraph, and to investigate the telephone systems which are giving good satisfaction. That Germany is carrying on extensive studies is well known, and within a few weeks other countries have taken active steps to see what can be done to build up a real telephone service. Among these newly interested governments are those of Italy and Spain, where telephone conditions are notoriously inadequate for serving even the most imperative demands of business men.

That the studies carried on by the engineers who will have charge of these projects will be thorough may be foreseen by all who are familiar with the patient spirit which guides the European scientific men. Transmission values and the like will come in for very careful comparison. The points which are likely to be imperfectly understood are those relating to operation, and, as was the case in this country, distribution, on account of imperfect estimates of the growth of the business.

As America is likely to receive so much attention from the foreign scientists which will have this work in charge it is important that our engineers should be well prepared to aid those who wish to learn of our methods. As the success of a system depends upon its being perfectly adapted to the uses to which it is put, it is desirable that those who wish to introduce our apparatus and methods abroad should know the conditions which prevail there. A study of the telephone requirements of Europe at this time, when the foreign engineers are eager for the information which they have only recently come to realize is so completely wanting, will be a great step toward bringing about a world-wide uniformity in telephone standards and practice.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

HOW FRANCHISES ARE GRANTED.

Will you please explain the various methods of granting franchises for the use of streets. There seem to be a number of different ways in which it is done and for our own information and the information of your other readers we should like to have the matter explained. C. M. H.

THE granting of franchises for the use of streets is controlled by statutes and these naturally differ in different States. In Ohio the probate court has jurisdiction to grant telephone franchises and to fix the mode of using the streets. In West Virginia it is the county court which has authority to consent to the placing of poles and wires along the county roads, and this right may be given to an individual as well as to an incorporated company. In Missouri a granting of the right to construct and operate a telephone company may be made to the company offering the highest percentage of gross receipts. In Michigan contracts with cities must be in writing, but an ordinance authorizing such grant and a bond given by the company accepting the conditions imposed is held to be a compliance with the statute. In Illinois city councils grant the right to use streets by resolution, although the usual method is to do this by ordinance. This is true also in Nebraska, in which State it is held that the object of the ordinance must be sufficiently expressed in its title. Telephone companies are given the right to use streets and roads by statute in Kansas, and the cities have only the power of regulating such use by exercise of their police power.

TO COMPEL THE PERFORMANCE OF CONTRACT OBLIGATIONS.

THE Cumberland Telephone and Telegraph Company has been sued in Louisiana by Clarence C. Barton. He avers that some time in 1899 the company through one of its agents entered into an agreement with him by which he was to allow the company to install poles and string wires upon a certain portion of his plantation. The company agreed to install a telephone in his house as soon as its poles and wires were located on his property, while he himself was to pay the cost of the poles and wires running from the main line to the house. Barton alleges that he performed his contract and that the company kept its agreement up to January 1, 1905, when it wilfully disconnected the telephone in his house. He seeks to compel the company to keep its agreement and in default asks the sum of $660. He only wants $500 for the use of his plantation, $100 for the poles and $60 for the labor required.

RETROACTIVE OPERATION OF TAX LAW.

THE city of Louisville, Ky., brought suit against the Ohio Valley Telephone Company for the purpose of recovering $2,477.06, being a franchise tax assessed against the company. It was conceded by the city that at the time the assessment of property for municipal purposes was constructively made there was no law in existence for the assessment of a franchise tax, but on November 11, 1892, the general assembly of Kentucky enacted a statute for the assessment of franchises. This law provided: "Every * * * telephone company * * * shall in addition to other taxes imposed upon it by law, annually pay a tax on its franchise to the state, and a local tax thereon to the county, incorporated city, town and taxing district, where its franchise may be exercised." After the enactment of this statute, the franchise of the company was assessed by the proper board, and the assessment duly certified by the proper officers of the city and county. The company refusing to pay the tax, this action was instituted. The question in the case was one of power merely. The Court of Appeals of Kentucky conceded that the legislature had the power to retroactively assess property for taxation, but stated that the intention so to do is never presumed. On the contrary, the presumption is that all taxing statutes are prospective, unless the opposite intent is expressly shown by the language used. The court found nothing in the act of the legislature to indicate that it was intended to be retroactive, but thought that its phraseology and all the circumstances surrounding its passage showed that it was intended to be prospective in its operation. The court recited in detail the indications of the legislature's intention and reversed the judgment which had been rendered in favor of the state. Justices Hobson and Nunn dissented from the opinion. Ohio Valley Telep. Co. v. City of Louisville, 94 S. W. 17.

REGULATION OF RATES MUST BE FAIR TO THE COMPANY.

THE City Attorney of Memphis, Tenn., has made an elaborate report concerning differences between the city and the Cumberland Telephone & Telegraph Company. In his report he finds that there is no positive, definite contract existing between the city and the telephone company by which the company can occupy the streets and alleys. The most that can be said is that the telephone company has built its exchange, put in its conduits, and erected its poles within the city limits with the consent of the city authorities. He gives it as his opinion that, in the absence of a contract to the contrary, municipalities have the right to regulate the charges of gas companies, electric light companies, street railway companies, and telephone companies, but in the exercise of the police powers the city is not unlimited, but must be reasonable. This power must not be exercised to the destruction of property rights, and it is the province of the courts to determine what is and what is not a valid exercise of police power. He concludes that in the regulation of the charges of the company, the city must be fair and reasonable.

NEGLIGENCE IN ANCHORING A GUY WIRE.

WHILE walking in a public alley adjoining his home in the City of Louisville, Ky., John D. Gasper was knocked down and crushed by a heavy wagon which permanently injured him. In the alley was stationed a pole belonging to the Louisville Home Telephone Company, from the top of which a guy wire ran obliquely down to a block in the ground. The wire ran eighteen inches within the side line of the alley, along a fence so near its color as to render the wire practically indiscernable. The hub of the wagon collided with the guy wire, which caused the wheel to slide up the wire until it overturned the wagon upon Gasper. The case having been appealed to the Court of Appeals of Kentucky, a judgment in favor of Gasper, the plaintiff, was affirmed. 93 Southwestern 1057.

SETTLEMENT ALLEGED TO BE FRAUDULENT.

THE Central Union Telephone Company is being sued in the Daviess Circuit Court of Indiana by Norval G. Little for damages received while he was climbing a pole said to have a rotten core which had become filled with moisture so as to act as a conductor.

When he took hold of an iron spike and for a foot rest stepped on another, he alleges that he was paralyzed by a current which passed through his body. The company alleges that he signed an unconditional release of all claims, to which he answers that the signature attached to the papers was obtained when he was in such a condition that he was unable to read and that he signed it under representation that he was giving a receipt for salary paid him.

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IN THE OPERATING FIELD

ATTEMPT TO ORGANIZE A NEW INDEPENDENT COMPANY IN NORTHERN KENTUCKY.

IF Cincinnati does not grant a franchise to an Independent telephone company it will soon be the only city in that part of the country which is deprived of connections with the many subscribers who desire to use only the Independent telephone.

The latest effort to complete the chain of Independent systems in this section has been made by James H. Young at a meeting of the Law and Internal Improvement Committee of the City Council at Newport, Ky.

For some time past residents of Covington and Newport have been anxious to secure the benefits of Independent service and the effort for the organization of the new company is extremely likely to receive their hearty support. If this proves successful it will add two more sections to the wall which is being so firmly built up around Cincinnati. There is a growing sentiment that much valuable trade is being diverted from that city through lack of connection with a large number of people who formerly were regular customers, but have now transferred their business to cities which they can easily reach by telephone.

LONG DISTANCE SERVICE TO BE FURNISHED IN MEXICO BY INDEPENDENT COMPANIES.

IT is stated that the Compañia Telefonica Mexicana of Monterey is to begin work on the construction of a long distance telephone line to Saltillo, and thence on south to San Luis Potosi. It is also stated that the company contemplates connecting the line with Mexico City, thus giving Monterey direct telephone connection with Mexico City. The line will run from San Luis Potosi to Mexico City, a distance of about 500 kilometers, if the present plans of the company are carried out.

This line to Mexico City has been contemplated for some time by the directors of the company. The entire distance from Monterey to Mexico City is about 1,100 kilometers. The line will follow the course of the National Railroad for the whole distance. Branch lines will probably be constructed to the principal cities and towns along the route.

The very best materials obtainable will be used in the construction of this line. All of the equipment will be modern and up-to-date and the line will make possible an excellent long distance service. This line will be of immense importance to all kinds of business, and much time and expense will be saved by the establishment of this connection.

OHIO COMPANIES CONTINUE TO ADVANCE RAPIDLY.

THE Ohio Telephone Syndicate is making excellent progress in the reorganization plans for the properties recently taken over from the Federal Telephone Company. The United States Long Distance Company has this week completed and cut over the new circuit between Cleveland and Berea. The two new circuits to Lorain and one to Elyria will be completed in about two or three weeks, dependent upon the promptness of delivery of supplies. The completion of the Lorain circuits will make it possible to cut into service the third circuit between Cleveland and Toledo, as beyond Lorain it is a matter of stringing wires only, no crossarms being required. The United States Company has seven construction crews at work in various sections of the State, and present efforts are being concentrated upon the needs of the long distance service. The development of the local exchanges taken over by the United States Company will follow later.

As to the Cuyahoga company, General Manager McVey states that he is pleased with the progress made, and looks for the best results this fall and thereafter. Mr. McVey has adopted a motto in his plans for the local company that will be well worth watching. He was placed in charge of the United States company about a year ago, and in a few months had saved to the company some $70,000 in operation alone. Much interest was therefore manifested in his probable movements when the Cuyahoga company came within his jurisdiction a few months ago. Mr. McVey has not yet announced the results of his work, but the users of the company's lines say that the property is being placed in a position to give perfect service. The Bell people are doing all sorts of reckless financing, including rate cutting,

	1906.	1905.	Increase.
Gross earnings.....	$33,594.36	$29,169.94	$4,424.42
Operating expenses, including maintenance and general expenses..	12,759.20	14,107.71	*1,348.51
Net earnings.....	20,835.16	15,062.23	5,772.93
Taxes	1,085.36	894.56	190.80
Bond interest.....	8,983.33	8,687.50	295.83
Reserve, etc.....	1,197.71	†419.88	1,617.59
Pfd. dividend.....	1,816.00	1,816.00	.....
Com. dividend.....	5,000.00	.....	5,000.00
Total	$18,082.40	$10,978.18	$7,104.22
Surplus	2,752.76	4,084.05	*1,331.29

*Decrease. †A credit item.

Comparative Statement of U. S. Telephone Company's Earnings for June this Year and a Year ago.

and installations by the thousands are being made at prices that preclude profits and in localities that must ultimately mean a heavy proportion of discontinued connections. Mr. McVey states that he would rather have one satisfied client than half a dozen at the expense of installation and removal of half of them. The policy of the Cuyahoga company is one of conservatism and sanity. Such a policy will always win.

ITALIANS TAKE UP WORK OF IMPROVING TELEPHONE SYSTEMS IN SEVERAL CITIES.

CONSUL Paul Nash, of Venice, reports that the telephone service in Italy, both urban and intercommunal, has hitherto been almost entirely in the hands of two great companies—the Societa Alta Italia, operating in Milan, Genoa and Turin, and the Societa Generale Italiana pei Telefoni ed Applicazioni Elettriche, controlling Bologna, Florence, Rome, Naples and the Sicilian towns.

In the beginning of 1904 the ministry of posts and telegraphs took over the Venice telephone system, extending the service, raising the pay of the employees, and reducing the rates, but, in spit of increased expenses, putting aside some $12,000 a year toward a fund for the changing of the entire system. The time has now come when bids for this change are being made, and already three have been received—one from an American, one from a French, and one from a German firm. These bids are yet to be submitted to the ministry at Rome by the local director, and there is still time for other American firms to compete if they act promptly.

The ministry of posts and telegraphs recently appointed a commission to investigate the telephone service throughout the country, with the result that in many places a complete change was found to be necessary. In Rome, for example, the service was found to be extremely bad, and that town will probably be one of the first to be modernized in this respect. The appointment of this commission was the first step in the project of the ministry to take over control of the telephone service of the whole country.

The director of the local exchange states that the American

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central energy system is in use at Milan, and that as it gives perfect satisfaction the tendency will be to adopt it generally. He also says that of the three propositions already submitted to him for the new exchange in Venice that of the American firm seems to be the best, and that although the actual choice does not rest with him he believes the minister will award the contract to this firm, provided, of course, nothing better is forthcoming.

American desk telephones should find a ready sale in Italy. The only thing of the kind in use in Venice is a French production known as the Bailleaux-Ader, which, although excellent as far as mechanism is concerned, is inclosed in a large wooden box, and is too heavy and cumbersome for convenience. It has, however, one feature which appeals to local users—the combination of the transmitter and the receiver on one handle. This is said to maintain the lips at the proper distance from the transmitter, besides having the advantage of leaving one hand entirely free.

SOME FEATURES OF ALL-CABLE DISTRIBUTION.

(*Continued from page* 155.)

Laying out of cable on main frame shall be after the following manner:

Cable shall be opened and laid in main frame, taking great care to keep layers intact. Then beginning at heel of cable and counting from left to right, take off 50 pair, and distribute to bar in regular sequence from 1 and 2 to 49 and 50, the latter being the nearest the heel of the cable. In a like manner, take off another 50 pair and distribute to next block with highest number towards heel of cable and so on, following completely around each layer, until used up and breaking into next layer where last one finished, until cable is all distributed.

In making splices, straight away or branch, this same arrangement shall be kept in mind: splicing by layers and keeping position of individual pairs straight and tapping outside layers till used up. This idea must positively be carried out as it will facilitate all the work of opening and tapping cables, and will decrease liability of trouble that arises from ordinary methods of digging through outer layers of pairs to get out those that may be in center of bunch.

ASSIGNMENT OF CABLE IN BLOCK WIRING.

Cable of sufficient capacity shall be carried into the district to be reached. This may require any number of blocks of 50 pair. Once into the district, it branches from terminal point in sizes required and from these branches, taps shall be made where a cluster of subscribers may be reached with the shortest runs of lead encased pairs and in heads that will allow a per cent. of growth.

Cable so distributed will be carried around the walls at convenient levels and in such manner as to cause no trouble or inconvenience to property owners and looking also to the safety of the cable.

Cable shall be secured to the walls by lead straps 18 inches apart and secured by nails, shall be suitably covered by pipe or boxing in exposed places, and wherever carried across gap caused by difference in height or length of buildings shall be carried on messenger of required size secured to buildings.

In assigning cable to office buildings, if building is a small one, sufficient cable shall be carried into building to serve every room and shall terminate at nearest possible point to a common center in radiating to all rooms.

In assigning cable to large office buildings of many stories and large floor space, cable of required capacity shall be carried to basement and beginning there, each floor may be considered a separate community and combined direct and multiple taps brought out of the feeder cable, carried up the shaft for such purpose. This class of buildings will probably call for treatment specified in clause 27, general specifications attached.

CHANGING HEADS FROM ONE CABLE TO ANOTHER OR OPENING NEW HEADS.

If at any time a subsequent arrangement is called for, or demand creates new heads in a block of cable, materially altering arrangement of its initial installation, or new heads should be cut in between existing heads and office other than were planned for, at the installation, it will be necessary to change block letter and tap numeral and street location of such heads to restore sequence of numbers in records—in other words, a tap may be changed as a cut is made in open wire construction, care being taken to note same in all records bearing on taps and to have its pole marking changed to conform.

MAKING BRANCH TAP FROM OVERLOADED POLE TO BUILDINGS.

Permission from property owner having been obtained, a suitable eye bolt shall be fastened to the walls, preferably by expansion bolts and a light messenger carried across from main messengers and at the same level and if possible, at right angles to route.

Cable shall then be carried to the selected distributing point on face of the wall, fastened at every 18 inches with lead cleats, and running in vertical and horizontal lines.

The distributing rings such as are to be used for house work shall be attached to the wall with expansion bolts and in the least conspicuous position, preferably behind signs or projecting cornices, if on front walls; if on rear or side walls, this will not matter, but the idea of neatness and sightliness must always be had in mind.

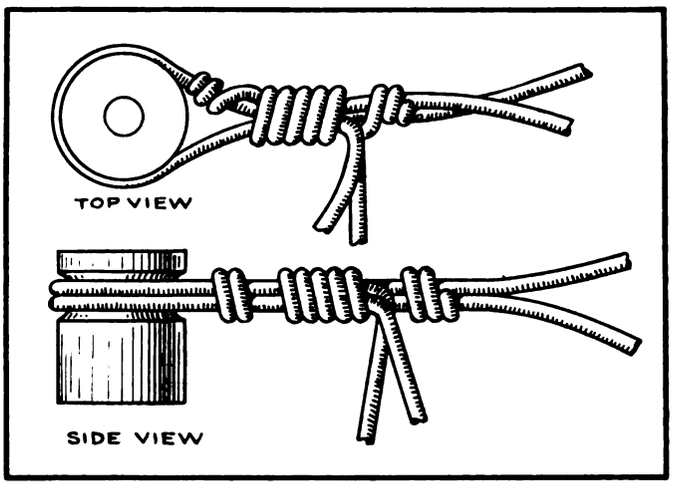

Fig. 7. Method of dead-ending No. 14 rubber covered twisted wire on knob, ring or bracket.

From the distributing head, lead encased single pairs will be run, concealed as much as possible, to the surrounding subscribers.

In this and all other points in this cable plan, it will be the aim to reduce to the smallest unit the amount of individual wire or pairs carried anywhere by bringing them in each case to a point where the required number of sub-stations can be reached with the shortest runs of wire.

MADEIRA LOOKING TO UNITED STATES FOR TELEPHONE SUPPLIES.

CONSUL MAXWELL BLAKE, of Funchal, reports that a telephone system is badly needed on the island of Madeira. The country contains 150,000 people, one-third of the number residing in Funchal, a rich and prosperous city, the trade of which is carried on by Portuguese, English and German merchants. The place is also a winter resort, with numerous hotels and villas occupied about six months of the year. The different business enterprises carry on business throughout the island, which is rather mountainous, so that communication is difficult. The island is 35 miles long and 3 miles wide. A franchise for a telephone system might be secured from the Lisbon Government, especially if Portuguese capital were interested in the enterprise. No American money is invested in this rich island, and it is hoped by the consul that this chance will not be neglected.

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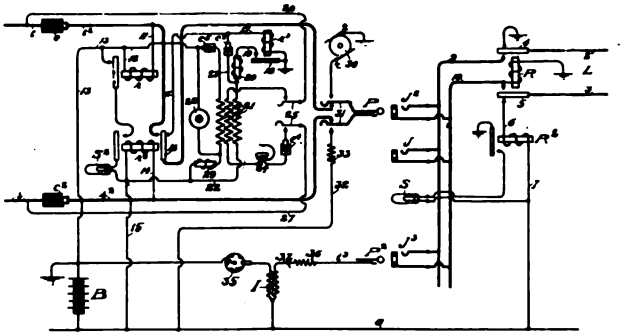
TELEPHONE PATENTS

SPECIAL BUSY TEST.

Charles S. Winston, Chicago, Ill., patents (No. 825,439; dated July 10, 1906; filed December 22, 1904; serial No. 237,911) and

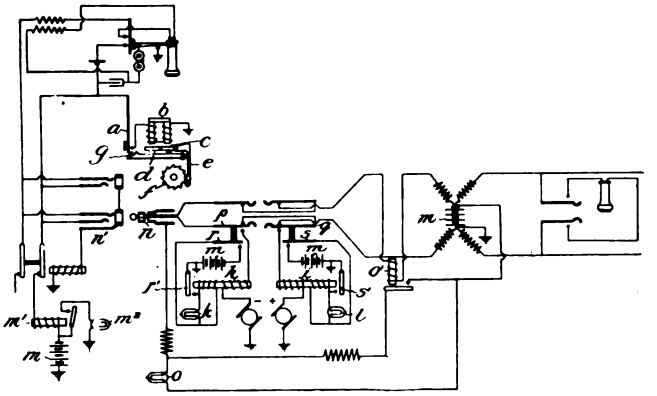


assigns to Kellogg Switchboard & Supply Company, Chicago, Ill., a special busy test for telephone lines.

The inventor provides for a trouble test which does not interfere with the usual busy test. If the line *L* is in trouble the operator inserts plug P^2 into jack J^2. Current from battery *B* flows through conductor *8*, conductor l^2 and jack J^2 to the cut-off relay *R* actuating it. An alternating current is also impressed on this circuit through the secondary of the coil *R*, induced from the primary circuit containing the interrupter 35. If the operator touches the tip of the plug *P* to the sleeve of the jack J^2 this alternating current will flow over conductors 16 and 17 to the condenser C^9 through which it flows to the tertiary winding of coil 21 and through conductors 22 and 15, completing the secondary circuit. It is evident that a hum will be produced in the operator's receiver 24 which is in the secondary circuit of coil 21, thus informing her that the line *L* is in trouble. The retardation coil 20 is interposed in the path closed through 19 to ground by the operation of the busy test relay r^3 to prevent alternating current from flowing back to ground connected to the relay armature. It does not flow to the ground through relay r^3 owing to the high impedance offered by its winding.

MEASURED SERVICE SIGNAL.

Frank R. McBerty, Evanston, Ill., patents (No. 828,419; dated Aug. 14, 1906; filed Oct. 7, 1905; serial No. 281,743) and assigns

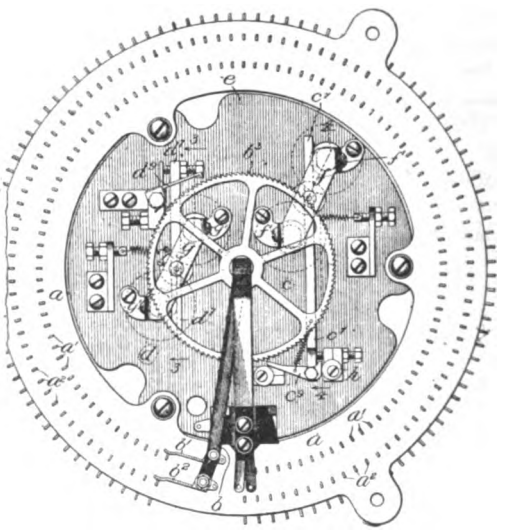


to Western Electric Company, Chicago, Ill., a register-signal for measured-service telephone-exchange systems.

There is provided at the subscribers' sub-station the polarized relay *b* which controls the centrally pivoted armature *c*. This armature actuates latch *d* when moved in either direction. The armature holds the pawl *e* which operates the registering train. To call central the subscriber depresses the key *a* and the operator plugs in at *n'*. If at the end of the conversation the operator wishes to advance the registering train she depresses the key *p* and current flows from the generator through relay *b*, revolving the ratchet *f*. When key *p* is depressed the contact *r* is closed and at the same time contact at *r'* is also closed by the attraction of the armature. To make sure that the apparatus in the subscribers' sub-station has been actuated the operator depresses key *p* a second time, and if the key *a* has been released the signal lamp will not light. In case the number desired is not obtained the operator depresses key *q* and thus releases the key *a* without advancing the registering train *f*.

SELECTOR FOR AUTOMATIC TELEPHONE EXCHANGES.

James L. McQuarrie, New York, N. Y., patents (No. 826,350; dated July 17, 1906; filed October 16, 1905; serial No. 283,002) and assigns to Western Electric Company, Chicago, Ill., a selector



for automatic telephone exchanges of the type used in small offices by the Bell companies.

The object of this invention is to provide, in a selector for automatic exchanges, an improved arrangement of the mechanism for controlling the selector arm.

Fig. 1 is a plan view and Fig. 2 is a side elevation of the selector. The selector arm *b*, which is advanced by the rotation of a ratchet wheel b^3 carries two contact brushes b^1 b^2, adapted to trail over the pairs of stationary line terminals a^1 a^2, arranged in a circle about its axis.

The armature c^7 of the stepping magnet *c* carries a pawl c^8, which when the armature is in its normal unattracted position is held by the pin *h* out of engagement with the teeth of the ratchet wheel b^3. When the armature is attracted, the pawl c^8 is released from the pin *h* and is drawn by a spring into engagement with the teeth of the ratchet wheel to advance it one step for each impulse of current through the stepping magnet.

The armature d^7 of the retaining magnet *d* controls a pawl d^8, normally holding it out of engagement with the ratchet wheel b^3, as shown in Fig. 1. When the armature d^7 is in its attracted position, the pawl d^9 is released and holds the ratchet wheel in its advanced position.

When a subscriber operates his interrupter in the usual manner

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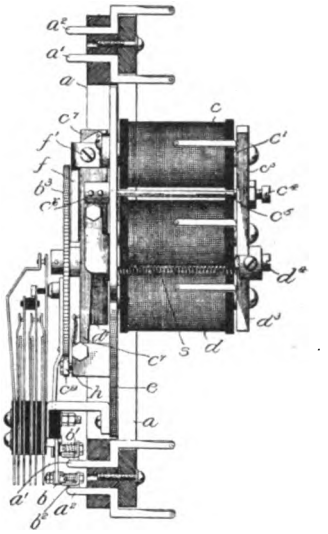
in making a call, the stepping magnet *c* is caused to intermittently attract its armature c^1 and so to advance the selector arm step by step. The selector arm is held in its advanced position by the retaining pawl d^6, controlled by the retaining magnet *d*, which is made sluggish, so as not to follow the pulsations of the current, but to keep its armature steadily attracted. When the magnet *d* is deënergized, its armature d^5 is drawn back by a spring and

Fig 2.



withdraws the pawl d^6 from engagement with the ratchet wheel. The wheel and the arm *b* are then returned to their initial position in the usual manner by a coiled spring *s*.

ANTISEPTIC MOUTHPIECE GUARD.

Gerhardt E. Grimm, Philadelphia, Pa., patents (No. 823,494; dated June 12, 1906; filed August 12, 1905; serial No. 273,879; divided and this application filed May 18, 1906; serial No. 317,419) a guard for the mouthpieces of telephone transmitters. The inventor provides for a guard which he claims is cheap to manufacture and so designed as to be capable of quick and secure adjustment on the mouthpiece of a telephone. The appliance is made entirely of paper with the exception of a plate or diaphragm of antiseptic material and the wire staples which hold the parts together. Arrangements for the insertion of antiseptic sheets in a form of the device into which they may be readily inserted or removed, and also the fastening of the sheets by a suitable adhesive in another modified form of the guard are covered in the patent.

TELEPHONE LIGHTING SYSTEM.

Thomas J. Merryman and Carl L. Allen, Lincoln, Nebraska, patent (No. 823, 886; dated June 19, 1906; filed August 25, 1904; serial No. 222,044) a telephone lighting attachment.

The invention provides for a miniature incandescent lamp which is designed to be mounted on a telephone, enabling the user to conveniently consult the directory, etc. The current for the lamp is supplied from the local battery of the telephone.

In order to switch the current to the lamp a push rod is provided which projects beyond the side of the telephone box. The lamp is mounted on a clip with a projecting ear which reflects the light downward and shields the eyes from direct rays.

Different methods of mounting, to correspond with the ordinary types of telephones, may be employed.

GUY ANCHOR.

Charles J. Widmer, Sydney, Ohio, patents (No. 816,631; dated April 3, 1906; filed September 14, 1905; serial No. 278,386) a guy anchor.

The objects of this invention are to provide an anchor which can be set in position by turning with a wrench, and also an eye for the attachment of the guy wire which can be removed from the shaft.

To acomplish these results the inventor provides a special blade which encircles a cylindrical member, pointed at one end to facilitate its entrance into the earth. The other end is formed into a rectangular surface for the purpose of engaging the sleeve of a wrench employed to screw the device into the ground. To the rectangular portion is attached a ground rod, threaded at its upper end to engage the threads of the detachable eye. In operation the eye is removed, the wrench is slipped over the rod and engaged with the rectangular portion of the anchor, which is then screwed into the ground. When it has been set at a proper depth, the wrench is removed and an eye of suitable size is fastened to the rod.

TELEPHONE SYSTEM.

Elmer A. Terpening, Geneseo, Ill., patents (No. 811,972; dated Feb. 6, 1906; filed Sept. 3, 1903; serial No. 171,851) a telephone system.

The object of this invention is to protect the normally open circuit of the induction and receiver coils at a substation from high static charges or discharges. The inventor claims that from his experience these parts are more liable to be destroyed from such causes even when their circuits are open than the coils of the ringer, which are bridged across the line. To enable the desired protection to be secured an additional spring is mounted adjacent to the transmitting and receiving contacts at the hook. When the hook is down the closed contacts short-circuit the instruments. A special system of wiring is so designed that the short-circuiting of the above mentioned circuits does not embrace the local battery employed for talking purposes.

WALL SET.

Jules A. Birsfield, Rochester, N. Y., patents (No. 828,835; dated August 14, 1906; filed February 13, 1905; serial No. 245,528) and assigns to the Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., a wall set.

The various parts of the wall set, with the exception of the condenser, are contained in a sheet metal box which is open at the back. This box is detachable from the base, which is designed to be permanently fastened to the wall. In Fig. 1 is shown the front view of the wall set, in Fig. 2 the side view and in Fig. 3 the rear view of the box detached from the backboard. In Fig. 4 is shown the front view of the base. Fig. 5 is a vertical section of Fig. 4 on the line 5, 5. The condenser is held in place by the lower clamps 2, 2, and the upper clamp 4, which is fastened by screw 12. The receiver hook and switch are mounted on a block 13, and secured to the side wall 14 by means of

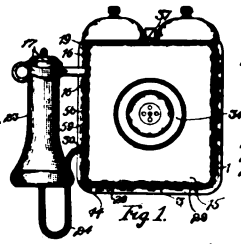


Fig 1.

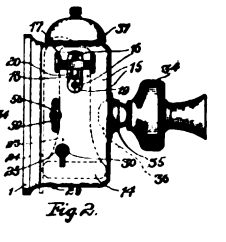


Fig 2.

screws 16. The ringer mechanism is fastened to the upper wall of the cover. The box is fastened to the base by hinge members 48 and by the screw 56. This screw 56 engages the threaded

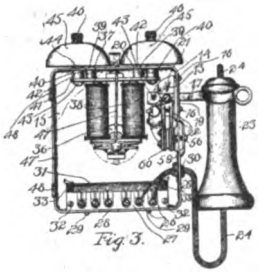


Fig 3.

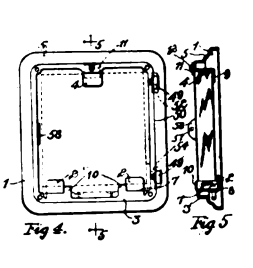


Fig 4.

Fig 5

opening 57 in the lug 58, extending from the corresponding base wall. The leaf spring 59 tends to withdraw the screw, but its action is limited by the collar 60. The locking screw is thus prevented from falling out of the cover and perfect alignment is secured. To lock the box it is only necessary to depress the screw and at the same time turn it with a screwdriver.

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

INTERIOR WIRING ON PLASTER.

THE difficulty of keeping slack out of wires run over plaster walls is frequently one of the greatest annoyances met by the telephone installer. It is essential that paired wires should not be forced together with too much pressure, and yet they must be firmly gripped.

The form of support devised by the Blake Signal and Mfg. Co., 246 Summer street, Boston, Mass., and known as the Blake compressed cleat, is said to be giving very good satisfaction for this class of work. It keeps the wires separate, yet holds them very firmly in place. While very strong it is small in size, and so designed as to be inconspicuous, but neat in appearance when examined. There is said to be no loss from breakage, and the company claims that its use makes its possible to do interior work very economically. The manufacturers will send full information to interested persons upon request.

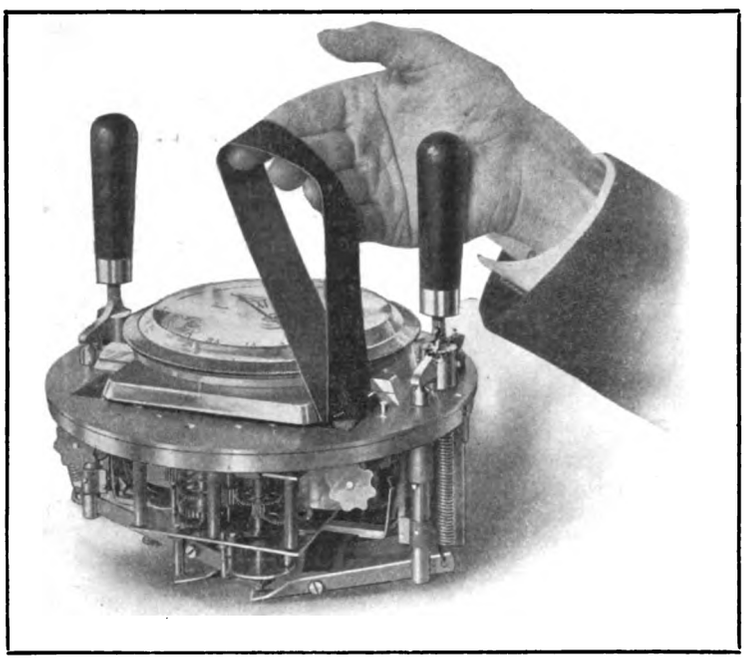

Fig. 2. Unwinding ribbon from spools.

THE AMERICAN AUTOMATIC TELEPHONE COMPANY, 200-206 South avenue, Rochester, N. Y., has recently issued a leaflet showing its desk stand for use with a two wire system. This instrument is very neat in appearance, and is provided with a selector of the type manufactured by this company. The company claims that it is a remarkably simple piece of apparatus owing to the fact that the system with which it is used has only two wires and no ground connections. Those who wish to see what sort of an appearance the instruments put upon the market by this company present may secure a copy of the leaflet by writing to the company.

LOUIS M. PIGNOLET, 78 Cortlandt street, New York, has issued a booklet describing the new types of switchboard voltmeters and ammeters which have recently been put on the market, and portable instruments. A number of the features referred to make the instruments especially satisfactory for use in telephone exchanges.

THE GOULD STORAGE BATTERY COMPANY, 1 West Thirty-fourth street, New York, has issued an exceedingly attractive booklet describing its batteries for telephone work. The characteristic features of the Gould cell are explained with great care, the object being to show the reasons for the long life and low maintenance expense which are said to be the distinguishing features of these batteries. It also contains other items of information which should be interesting to telephone men, and may be obtained by writing to the company.

THE OKONITE COMPANY, LTD., New York, N. Y., has issued a leaflet giving the specifications that it has established as a standard for its 30 per cent rubber insulating compound for wires and cables. These specifications are determined by chemical, mechanical and electrical tests, and the Okonite Company states that the purchaser may send to its plant a representative, who will be afforded all necessary facilities for making tests to satisfy himself that the specifications are followed.

RENEWING A CALCULAGRAPH INK RIBBON.

RECORDS upon toll tickets are printed in the Calculagraph by means of an inked ribbon very similar to that used in a typewriter. After the ribbon has been in use a certain length of time or until the ink is exhausted, it must be renewed, and in order to accomplish this the following procedure must be gone through. In the first place the three screws which fasten the card plate should be taken out with a small screwdriver. This leaves the card plate completely unfastened and it may be readily removed from position by simply grasping it between the thumb and fingers and sliding it forward. Two thumb screws, one of which is opposite each operating lever, are then removed in order that the mechanism may be taken out of

Fig. 1. Removing Calculagraph from case.

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Gray Pay Stations Pay

When the American Public are telephoning they don't want to be required to do manual labor, such as pulling levers. With Gray Stations you simply drop in the coins.

GRAY TEL. PAY STA. CO. HARTFORD, CONN.

FOR SALE

For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE—Multiple, lamp signal central energy switchboard of latest Stromberg-Carlson make. 1-sec. mag. local, 1-sec. mag. long distance, 4-sec. (120 lines each), central energy. Just from the factory. Not yet unpacked. Terms to suit. Address Piedmont Electric Co., Anderson, S. C. 653

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

DRAUGHTSMEN—Mechanical, electrical, structural, architectural—are at a premium. In a recent issue of "Opportunities," our monthly publication, we listed 104 positions for draughtsmen at salaries of $900-$2,500. Sample copy of "Opportunities" is free for the asking. Hapgoods, 305 Broadway, New York. 464

WANTED—One first-class line construction foreman; also four first-class telephone installers and line inspectors. Address Box 659, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 659

RECRUITS DESIRED FOR SIGNAL CORPS, U. S. ARMY—Pay ranges, according to service, home or foreign, from $13 to $90 per month, and in addition rations, quarters, clothing and medical attendance are furnished. The Signal Corps offers unusual opportunities for foreign service and rapid promotion to young men of character, intelligence and ability who have had electrical training. For detailed information write to Chief Signal Officer, U. S. Army, Washington, D. C. 660

WANTED---Continued

TRAVELING position wanted by experienced man capable of looking after a string of exchanges, board, cable trouble and the cable splicing. Best of references. Address Box 663, care THE AMERICAN TELEPHONE JOURNAL, 100 William St., New York City. 663

WANTED—Twenty first class telephone construction foremen. Opportunity for advancement for the right men. No strike. Address Pioneer Telephone & Telegraph Co., Oklahoma City, Okla. 669

WANTED—Successful telephone contract agent desires position with progressive Independent telephone company. Correspondence desired with companies who contemplate raising or adjusting rates, selling coupons. Local and toll business developed, results guaranteed. Address box 670, care The American Telephone Journal, 100 William street, New York. 670

WANTED—Position as trouble-man or manager of small exchange. Understand both magneto and common battery systems. At present employed as manager of a Bell plant, but wish to change to Independent field. Best of references. Married. Address Box 671, care The American Telephone Journal, 100 William street, New York. 671

DRAUGHTSMEN wanted who are able to lay out plans for the interior cabling of large exchanges. Men who have done installing preferred. Address Box 672, care The American Telephone Journal, 100 William street, New York. 672

BAIRD SHEET-STEEL CASH-REGISTER PAY-STATION

Has it a LEVER? Has it SPRINGS? **"YOU BET"**

POWER is essential to "DO THINGS."

Baird Pay-Stations have numerous important features which are impossible in out-of-date "Automatic" apparatus. Write for Bulletin No. 51.

BAIRD MANUFACTURING CO., 1503 Briar Place, CHICAGO

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the case. Their withdrawal is readily effected by turning them with the fingers. All that now remains to be done to make the mechanism fully accessible is to take it by the two handles and lift it out of the case by a straight vertical pull (Fig. 1.) The ribbon which has become unfit for use may then be drawn out, as shown in Fig. 2, by unwinding it from both spools. Then pins which fasten the ends of the ribbon to the spool tape should be removed, thus freeing the old ribbon from all connection with the machine. By means of the pins one end of the new ribbon should be attached to the left hand spool, and the ribbon should then be wound by turning this spool in the same direction it takes when the ribbon is fed to the left by operating the levers (Fig. 3). When about one foot of the ribbon remains unwound pass it over the two rollers into the card slot (Fig. 4). In performing this operation care should be used to avoid folding the ribbon. After this has been done the remaining end of the ribbon may be fastened to the tape of the right hand spool. There is still remaining a certain slack portion which should be wound on the right hand spool by turning the spool wheel in the same direction that it would be moved by the right hand ratchet (Fig. 5). The ribbon shifter should then be so adjusted that its pointer is directed to the letter R. After this has been done the machine is ready to put in the case, and after it has been dropped in it should be fastened with the thumb screws. After the card plate is replaced and fastened by the screws which were originally removed, the Calculagraph is ready for use. Information concerning the use of the instrument, expense of securing accurate timing of toll tickets by this time-saving method and other details may be obtained on application to the Calculagraph Company, 1437 Jewelers Bldg., New York City.

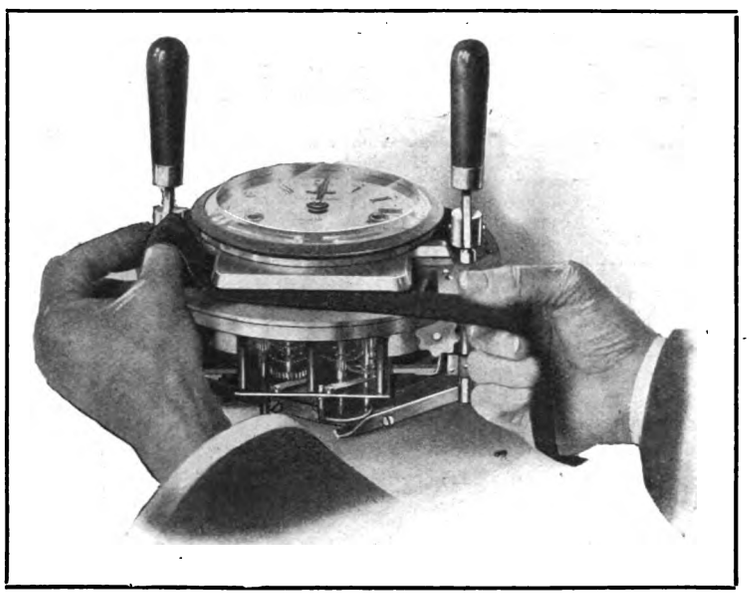

Fig. 4. Passing ribbon into card slot.

THE CENTURY TELEPHONE CONSTRUCTION COMPANY, Buffalo, N. Y., reports the closing of contracts on magneto switchboards for Cortland, N. Y.; Canaseraga, N. Y.; Lodi, N. Y.; Lisle, N. Y.; Belmont, N. Y.; Interlaken, N. Y.; Brookton, N. Y.; Caywood, N. Y.; Berkshire, N. Y.; Russell, Pa.; Orchard Park, N. Y.

The company has also obtained contracts for common battery switchboards for Cortland, N. Y.; Cornell, N. Y.; Sonyea, N. Y.; East Aurora, N. Y.; Friendship, N. Y.; Paducah, N. Y.; Hammondsport, N. Y.

THE ELECTRICAL APPLIANCE COMPANY, Chicago and San Francisco, has recently issued a little folder entitled "How Long Should Sixty Cells Ring 400 Telephones?" To throw some light on the subject the case of an exchange in Southern Ohio is cited, in which 60 cells of the 1900 dry battery rang 400 telephones for 26 months.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, of Rochester, N. Y., reports having closed contracts for switchboards for the following places: Port Byron, N. Y.; Shickshinny, Pa.; Packwaukee, Wis.; Knoxville, Tenn.; Port Williams, Wash.; Waterport, N. Y.; Sioux City, Ia.; St. Mary's, W. Va.; Shell Mound, Tenn.; Bridgeport, Minn.; Kentwood, La.; Palouse, Wash.

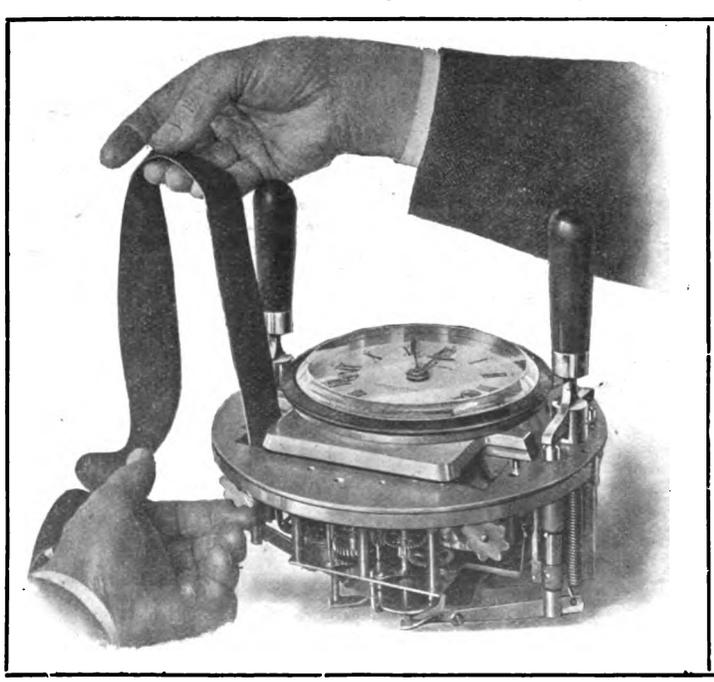

Fig. 3. Winding new ribbon on Calculagraph spool.

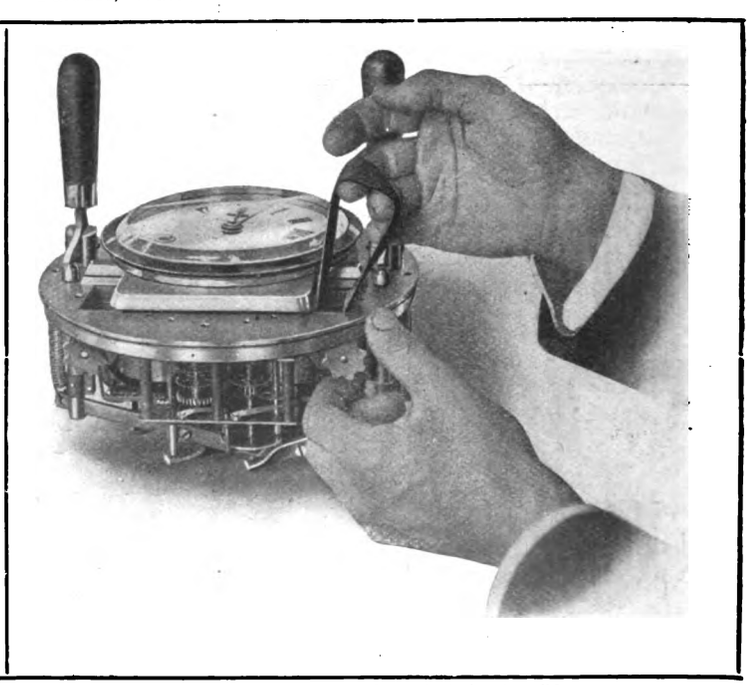

Fig. 5. Taking up the final slack in the ribbon.

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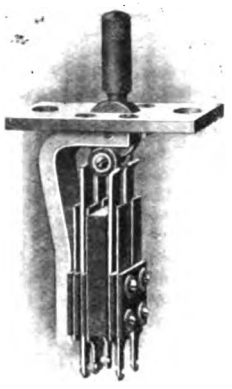
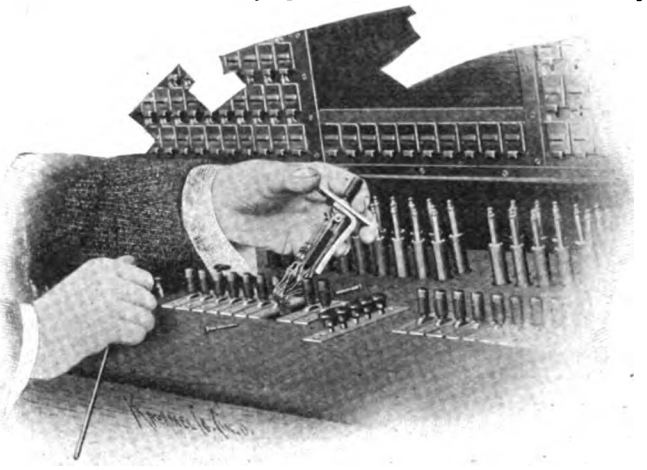
Unitype Switchboard



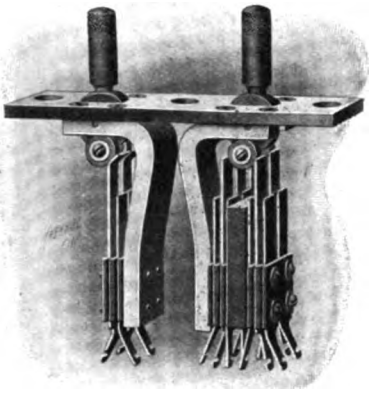
Standard Ringing and Listening Key.

Ringing and Listening Keys. The standard ringing and listening key is of the combined type, one handle operating both ringing and listening. It is therefore not necessary for the operator to move her hand from key handle when making a connection. Hard rubber rollers act upon the long flexible German Silver key springs, which are provided with pure platinum contacts. As the springs are mounted end up, no dirt can find lodgment there. The frame of key is made of heavy brass. Hard rubber is used throughout for insulation.

Every possible precaution is taken to prevent wear and bad contacts and we can honestly say from some years experience with this type of key, that it is the *most satisfactory and reliable key on the market to-day.*



Removing a Key from Switchboard. No wires to unsolder; simply take out two screws.



Ringing and Listening and Ring back Key.

The Method of Mounting Keys facilitates their ready removal. Each key is mounted by means of two *Machine* screws in the *Metal Mounting Frame* which forms part of the key table. To remove a key from the board, simply remove these screws and pull key upward, *sufficient slack being left in cable for this purpose.* The keys are not fastened together by means of bare strap wires for generator or operators circuit, but each key has its *individual set of wires* which permits of its instant removal as above described. Get our Bulletins.

THE SUMTER TEL. MFG. CO. SUMTER, S. C.

IT IS VACATION TIME —FOR SOME OF US

"We're weary a-walking the highway of life;
We're fretted and flustered with worry and strife."

This is the time of year when we all hear the "call of the wild." No one more than the man at the desk with outlook over heated roof and dusty street. If you happily can play this month, REMEMBER, we are working and instruct the proper party to send us your orders, for our busy spring has been followed by a hustling summer business. If you are working too, send us your orders. There is no better time than now for you to realize the truth of our claims for prompt shipment and attractive prices covering our extensive line of telephone apparatus and construction materials.

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Time All Toll Messages With The Calculagraph **IT PAYS**

The Calculagraph will print the elapsed time of every message and determine the exact overtime charge. Think what this amounts to on a hundred messages.---on a thousand.

It Makes No Clerical Errors

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THE WEEK'S MESSAGES

NEW COMPANIES.

BLOUNTSVILLE, ALA.—The Blountsville Home Telephone Co., of Blountsville, has been organized with a capital stock of $3,000. The company will build a local plant and also a line from Blountsville to Garden City. The officers of the company are A. F. Baines, president; J. D. Small, vice president; R. B. Sims, secretary, and F. B. Wilhite, treasurer.

JASPER, ALA.—The Home Telephone Company, of Walker County, Ala., has been incorporated with a capital stock of $5,000. The officers are E. M. Cranford, president; J. N. Odom and William Gurganus, vice presidents, and John A. Coleman, Jasper, secretary and treasurer.

SULPHUR ROCK, ARK.—A local telephone system will be established at Sulphur Rock with a capital stock of $2,000. The officers of the company are Sam Tuggle, president; J. K. Rawlings, secretary; W. R. Rice, treasurer; J. C. Gill, business manager.

SANTA BARBARA, CAL.—The Home Telephone and Telegraph Company of Santa Barbara County has been incorporated with a capital stock of $200,000. Among the stockholders are Paul O. Tietzen and Robert E. Easton of Santa Maria, and George S. Edwards, Harry W. T. Ross and Edwin F. R. Vail of Santa Barbara.

LUDLOW, ILL.—The North Harwood Telephone Company, of Ludlow, has been incorporated with a capital stock of $2,500. The incorporators are S. N. Cohen, H. M. Fisher and Hyman Soboroff.

WESTERVELT, ILL.—The Ridge Telephone Co., of Westervelt, has been incorporated with a capital stock of $3,000. The incorporators are A. P. Weakley, A. L. Henry and Charles Calvert.

CHEROKEE, KANS.—D. O. Lane, the owner of the Cherokee Telephone Exchange, has refused to give connection to the two mutual telephone lines recently completed to the Cherokee city limits from Girard and McCune. The citizens of Cherokee may organize another exchange.

LENORA, KAS.—The Lenora Telephone Exchange Company of Lenora has been incorporated with a capital of $2,500.

URBANA, KANS.—A rural telephone company has been organized and will connect with the Urbana switchboard and with the other rural lines about Urbana.

RUSSELLVILLE, KY.—The Russellville Home Telephone Co., of Russellville, has been organized with a capital stock of $50,000. The officers of the company are Judge Gaines Cooksey, president; J. E. Zeluff, vice president; H. H. Smith, secretary, and S. J. Rose, treasurer. The company will build several exchanges in the vicinity of Russellville. The system will be connected with the lines of the Independent Long Distance Telephone and Telegraph Co., and the lines of the Central Home Telephone Co., which are already built and operating through the city.

IDA, MICH.—The Ida Telephone Company has been incorporated with a capital stock of $5,000. The company will do business in Michigan and Ohio.

ST. CLAIR, MINN.—The St. Clair Telephone Company, of St. Clair, has been organized. The incorporators are H. Thielman, H. A. Campbell, F. Zink and others. The company has a capital stock of $10,000.

CHILLICOTHE, MO.—A telephone company has been organized by the farmers living along the Linneus Road in Livingston County. The line will terminate at the home of W. F. Weber.

GALENA, MO.—The Quaker Valley Mutual Telephone Company will extend its lines to Galena, where a telephone company is to be organized.

URICH, MO.—The Urich Telephone Company of Urich has been incorporated with a capital of $15,000. Among the incorporators are D. B. Halcomb, J. S. Blough, S. D. Wilson, G. G. Grimes and others.

HACKETTSTOWN, N. J.—The Hackettstown Telephone and Telegraph Co., of Hackettstown, has been organized. The officers are William A. Hoffman, president; Peter H. Welch, vice president; Robert A. Cole, treasurer, and Charles W. H. Dedrick, secretary.

STICKNEY, N. D.—The Stickney Telephone Company of Stickney has been incorporated with a capital of $10,000. Incorporators: Charles J. Fergen, P. F. Nolan, W. P. Smith, George Hough, W. G. Groves and W. T. Lathrop.

ARAPAHO, OKLA.—The Valleyview Mutual Telephone Company, of Arapaho, has been organized. The capital stock of the company is $800. G. H. Korth, Geo. J. Smart and E. J. Murphy are among the incorporators.

MIDDLETOWN, PA.—B. F. Meyers, F. D. Houck and Frank E. Zeigler, all of Harrisburg, Pa., will apply for a charter for the Middletown Telephone Co., of Middletown.

DELMONT, S. D.—A farmers' telephone company is building a line running twelve miles northwest of Delmont and connecting with the exchange there.

WEKOTA, S. D.—Articles of incorporation have been filed for the Freedom Rural Telephone Company, with headquarters at Wekota, one of the new towns on the Minneapolis and St. Louis Railway extension in Faulk county. It is capitalized at $5,000, and the incorporators are John Stephenson, Charles Halsig, Millard; Charles Bates, Faulkton.

ALICE, TEXAS.—The Alice and Rio Grande Telephone Company has been incorporated with a capital stock of $10,000. Felix Hobbs, J. S. Truner, and Phil Hobbs are among the incorporaters.

LUTHER, TEX.—A company has been organized with a capital stock of $10,000. Exchanges will be built at Luther and Wellston.

INGERSOLL, ONT., CAN.—The Ingersoll Telephone Company, Limited, of Ingersoll, has been incorporated with a capital stock of $100,000.

FRANCHISES.

DENVER, COLO.—F. H. Stow, of Portland, Ore., general manager of the Home Telephone Company, of Portland, and other Independent officials are seeking a franchise in Denver, Colo. It is expected that two million dollars will be spent as soon as the franchise is secured and much more ultimately.

MACON, ILL.—The Macon city council has granted a franchise to establish a new telephone system in that city to be known as the Farmers & Merchants' Company. Steps will be taken at once to put in a new system, which will give every farmers' line in the country free exchange under conditions that will be agreeable to the local company and all the country lines.

FARGO, N. D.—The North Dakota Independent Telephone Company is seeking a franchise in Fargo. A new building will be erected and a toll line constructed between Fargo and Bismarck.

SOUTH KINGSTON, R. I.—A franchise has been granted to the Home Telephone Co., at South Kingston.

FALFURRIAS, TEX.—A franchise has been granted Felix Hobbs of Falfurrias to construct a telephone line along the public roads of Starr County.

NEPHI, UTAH.—Alma C. Hyde of Nephi has applied for a telephone franchise. A company is to be incorporated and it is expected that work on the new system will soon be under way.

FINANCIAL.

CAPRON, ILL.—The Capron Home Telephone Company, of Capron, is increasing its capital stock from $3,000 to $10,000.

BURLINGTON, IA.—The Mississippi Valley Telephone Company has increased its capital stock from $25,000 to $50,000.

COMBINATIONS.

ALBANY, N. Y.—The United Message Co. is endeavoring to purchase a controlling interest in the Commercial Union Telephone Co., at Troy, N. Y.

NEW YORK, N. Y.—Plans for the consolidation of the Great Eastern Telephone Company, the New York Electric Lines Company, and the Consolidated Telephone Company of Buffalo, will include the formation of a holding company which will take over the outstanding stock in the three allied concerns. The capital stock is to be $50,000,000.

ELECTIONS.

HACKETTSTOWN, N. J.—The Hackettstown Telephone & Telegraph Co. has elected its officers, as follows: William A. Hoffman, president;

NEWS—WANTED

THE matter contained upon the Message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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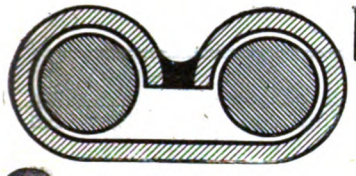
John Wanamaker says: "If there is one enterprise on earth that a 'quitter' should leave severely alone, it is advertising. To make a success of advertising one must be prepared to stick to it like a barnacle on a boat's bottom. He should know before he begins it that he must spend money—lots of it. Somebody must tell him, also, that he cannot hope to reap results commensurate with his expenditure early in the game. Advertising doesn't jerk: it pulls. It begins very gently at first, but the pull is steady. It increases day by day and year by year until it exerts an irresistible power."



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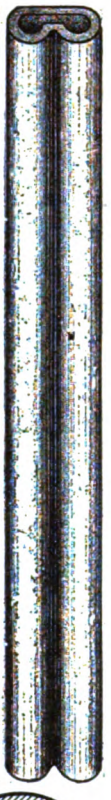
BEFORE TWISTING

Perfect Contact

Means more than increased conductivity—it means longer life to the joint because corrosion can't take place.

COOK'S SELF-WELDING WIRE JOINT

makes a permanently perfect joint every time. Free Sample to show you.



Frank B. Cook.

238 W. LAKE ST.
CHICAGO

COOK JOINT AFTER TWISTING.

MICHIGAN WHITE CEDAR POLES

In addition to the several yards we have had in the past, we wish to call your attention to our new yard which is located at Escanaba, Mich.

The acquisition of this new yard enables us to ship poles by all railroads or by the lake routes, thereby enabling us to give the best delivered prices.

The location of our new yard makes it easier to secure cars, thus facilitating prompt shipment.

In many cases poles can be shipped by car-ferry, making possible a great saving in cases of shipment to Eastern points.

We are wholesalers exclusively, shipping in car lots only.

Write us for delivered prices.

KELLOGG SWITCHBOARD & SUPPLY CO.
CHICAGO, ILL.

EVERY COIL

of **Roebling Double Galvanized Telephone Wire** bears a tin tag and lead seal upon which the word "**Roebling**" is stamped.

Don't accept Wire without the **Roebling Seal.**

JOHN A. ROEBLING'S SONS CO., - TRENTON, N. J.

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THE WEEK'S MESSAGES

Peter A. Welch, vice president; Charles W. H. Dedrick, secretary; Robert A. Cole, treasurer.

NEW ALBANY, PA.—At the annual meeting of the New Albany Telephone Co., at New Albany, the following officers were elected: A. J. Bird, president; Ray S. Wilcox, general manager.

PERSONAL.

H. C. JONES has been made manager of the exchange at Mayesville, Ky. He has recently been superintending installation of an exchange at Gadsden, Ala.

DANIEL MOGEE has been made manager of the Colorado Telephone Company's exchange at Aspen, Col.

FRED FRASER has severed his connection with the Home Telephone Company, Kansas City, Mo., to accept a position with the Mobile Home Telephone Company, Mobile, Ala. He will superintend the installation of its extensive underground cable system.

CHARLES PENNY has been appointed manager of the Central Union plant at Kenton, Ohio.

MISCELLANEOUS.

EXETER, N. H.—The People's Telephone Company, recently organized, is completing its plant and equipment. The company has installed an exchange at Exeter; constructed a line to Kensington, and controls lines to Kensington and Hampton Falls. Franchises have also been secured at Hampton, North Hampton and Rye, and connections will be established with these points.

LOUDONVILLE, O.—Owing to the greatly increased business of the Star Telephone Company at Loudonville, it will be necessary for the company to install a new exchange at that point. It is estimated that about $10,000 will be necessary for such installation. Next to the Ashland exchange, the home office, Loudonville, is the largest exchange of the Star system.

New Construction in the Field

FREMONT, IDAHO.—The Fremont Independent Telephone Company will soon commence the construction of its system.

WEISER, IDAHO.—Work has been commenced on the construction of the line to be built by D. B. Hartley from Weiser to the Mann Creek section. The line is to be known as the Hartley Mutual Telephone Company and will extend to the Thousand Springs Valley and Midvale, operating in connection with the Independent company.

WEISER, IDAHO.—It is the intention of the Weiser Independent Telephone Company to build a new exchange building at Weiser.

PANA, ILL.—Five thousand dollars will be spent by the Christian County Telephone Co., of Taylorville, in improving its lines.

TREMONT, ILL.—The Tremont Independent Telephone Company is making arrangements to build new lines in Tremont, and will also build several miles of country lines. It has recently installed a new switchboard and office equipment.

LAFAYETTE, IND.—The Lafayette Telephone Company will issue new stock to the amount of about $150,000 for the purpose of improving its system. A modern switchboard will be installed and the wires in the business portion of the city are to be placed underground and other improvements are to be made.

OSCEOLA, IND.—The Dunlaps Telephone Company, which now has connections with Elkhart, Goshen and Wakarusa, has under construction a direct line to Osceola. The company also hopes to be able to establish connections with Bristol.

AVOCA, IA.—The construction of the Harlan-Avoca Telephone Company's lines between Avoca and Council Bluffs has been completed.

MT. PLEASANT, IA.—It is the intention of the Mt. Pleasant Telephone Company to rebuild a portion of its system, and to make other improvements.

WAVERLY, IA.—New lines are being built by the Waverly Telephone Company in the city of Waverly to take care of its increasing business.

LEAVENWORTH, KAS.—The People's Home Telephone Company expects to lay 70,000 feet of underground conduit in Leavenworth.

PAOLA, KAS.—The Paola Telephone Company, which has recently installed a new toll board, contemplates the erection of a number of new lines, and the partial remodeling of its system. When the proposed changes have been made the Paola Company will have a plant which is strictly up to date in every particular.

HARTFORD, KY.—The Rough River Telephone Company will install a 400 drop switchboard, thus doubling the capacity of its exchange.

JACKMAN, ME.—Work on the Independent Telephone Company's lines has been commenced at Jackman.

HAVERHILL, MASS.—Extensive improvements and repairs are to be conducted by the People's Telephone Company of Haverhill, Mass.

MILFORD, MASS.—A new common battery system is to be installed at Milford by the Independent Telephone Company.

HEATH, MASS.—The Heath Telephone Company is extending its lines to Whately, at which point is will connect with the Northampton line.

WILLIAMSBURG, MASS.—The Citizens' Independent Telephone Company of Williamsburg is extending its lines from Haydenville through Northampton to Hatfield and Hadley. It will make connection with Florence and Leeds.

NEW LEXINGTON, O.—The Independent Telephone Company is constructing its telephone system at New Lexington, and expects soon to have its exchange installed at that city.

NEW PITTSBURG, OHIO.—A new switchboard has been installed by the Farmers' Telephone Company, of New Pittsburg. Excellent service is given, and direct connection with the Star Telephone Company is now possible.

PORTSMOUTH, O.—The Home Telephone Company is making many improvements in its system.

YOUNGSTOWN, O.—The Erie Railroad Company has decided to establish an Independent telephone system in the vicinity of Youngstown for its exclusive use. The company's stations at Brier Hill, Youngstown, West Middlesex, Wheatland, South Sharon, Sharon and Sharpsville will be included in this system.

SALEM, ORE.—By virtue of an order adopted by the City Council it is proposed that the telephone, telegraph and electric power companies doing business in this city be required to place all wires carrying an electric current underground within the city limits in the near future.

ALDERSON, PA.—The Commonwealth Telephone Company is building additional lines to Alderson, as the present system is inadequate to take care of the company's increasing business.

CONESTOGA, PA.—The lines of the Conestoga Telephone Company will be extended to Lorane.

PLYMOUTH, PA.—The Consolidated Telephone Co. is constructing a new line between Plymouth and Wilkes-Barre.

TRANSFER, PA.—The work of installing its new exchange at Transfer has been completed by the Pymatuning Independent Telephone Company. Connections have been established with the Union company's exchanges at Greenville and Sharpsville and it is the intention of the company to build lines throughout the entire township.

DELMONT, S. D.—The Farmers' Telephone Company is erecting a line running twelve miles northwest of Delmont, connecting with the exchange at that point. It also expects to build a line running northeast towards Parkston and Hillside.

HEARNE, TEXAS.—The Hearne Telephone Company is extending its lines in the city of Hearne.

FORT SAM HOUSTON, TEX.—Work has been begun on the installation of an automatic system at Fort Sam Houston. About forty-five telephones will be put in. There will be no connection with the city exchange.

SUNNYSIDE, UTAH.—The Eastern Utah Telephone Company is building a line to Sunnyside and Castle Gate. Connections are also to be made with the towns of Emery, Carbon and Unitah counties, with the exception of Clear Creek, Winter Quarters and Scofield.

ST. JOHNSBURY, VT.—The Citizens' Telephone Company is constructing a trunk line to Hardwick, and contemplates the construction of lines to Barre and Montpelier.

PETERSBURG, VA.—The Petersburg Telephone Company has been extending its lines in Petersburg. All wires in the business district will be placed underground and much aerial cable will be strung.

DE PERE, WIS.—The Fox River Valley Telephone Co. is extending its lines into the country south and southwest from the city of De Pere. A large number of rural subscribers have volunteered to give their services to start it as soon as possible.

VALLEY, WIS.—The lines of the Valley Telephone Company are being extended.

DINORWIC, ONT., CAN.—The Canadian Pacific Railroad will build a telephone line from Dinorwic to the Laurentian mine.

LLOYDMINSTER, SASK, CAN.—The town of Lloydminster is to extend its telephone system from Lloydminster to Lashburn and Vermilion.

MELITA, MANITOBA, CAN.—The Melita-Arthur Telephone Company contemplates the erection of a system in Brenda. It also expects to construct lines to Waskada and Napirka in the early fall.

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VOLUME XIV. SATURDAY, SEPTEMBER 15, 1906. NUMBER 11

New Equipment for Telephone Instruction at Purdue University

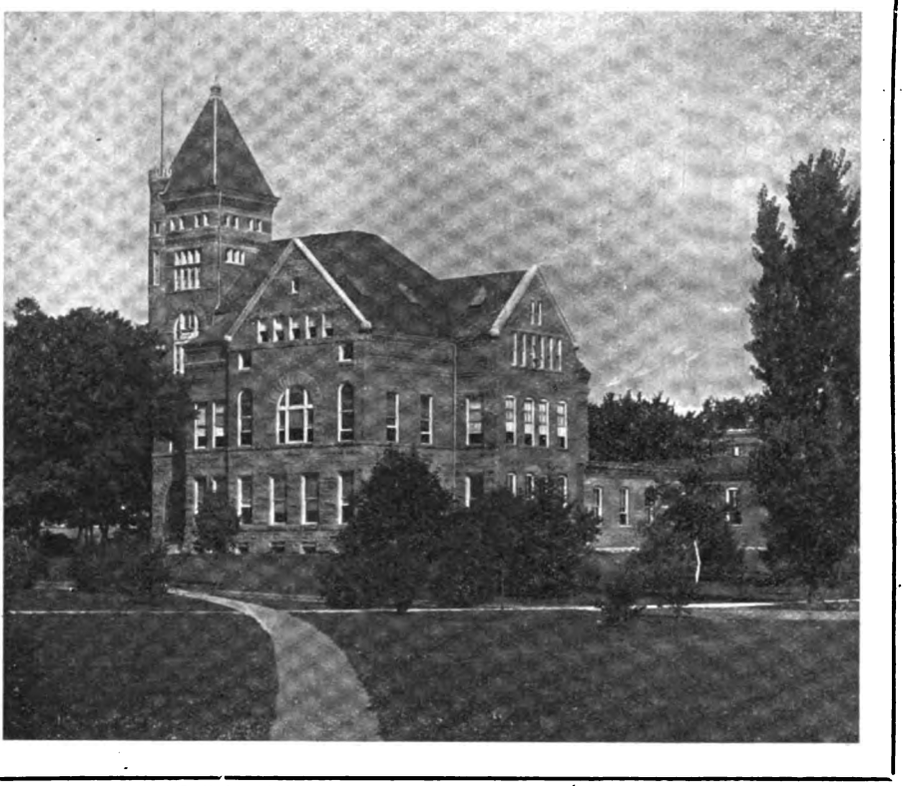
By Arthur Bessey Smith,

Instructor in Telephone Engineering.

THE design of a telephone laboratory must necessarily take into account the object to be attained by a technical course, the best means for securing that end, and the dangers of experimental work carried on under artificial conditions.

If it were desired to create a school for plumbers, we would expect to equip it with melting furnaces, lead pipe, and all the tools and fittings used by that trade. We would set the prospective plumbers to work learning the physical properties of lead, solder, iron, etc., and get them familiar with all that can be done with them in making the supply of water and the removal of sewage safe and sanitary. In short, they would cut pipe, learn to solder and make a good wiped joint, in addition to studying the best arrangements of pipes and fixtures.

If, however, we were going to educate a sanitary engineer, he would not spend all his time learning to wipe joints. If he did he would become only a plumber. He would require thorough training in all that goes to make life safe, the nature of various diseases caused by improper sanitary conditions, their symptoms, their exact causes, and all the machinery necessary to water and drain a city and dispose of its sewage without endangering people's health. He surely ought to know good plumbing when he sees it, and be able to make men do good work. But if he had spent all his time on wiped joints he would be unfit to be put in charge of large and responsible undertakings.



View of the Electrical Building, in which are Located the Laboratories of the Telephone Department at Purdue University, Lafayette, Indiana.

So with the telephone engineer. The time at the disposal of the telephone department is too short to give the student all the experience that he could get in a few years in the field. What, then, shall it give him? If he puts in his time learning to climb poles, stretch wires and splice cable, he will have learned no more than he can learn in the field, and will be only a lineman or a cable man. But the demand at present seems to be for men who can take more responsible positions, those of a strictly technical or engineering nature. In these the requirements are primarily a thorough knowledge of all the laws of nature that affect the telephone, and a familiarity with telephone apparatus and accessories and what can be done with them. The value of knowing how to climb poles is not underrated, but the value of technical knowledge is appreciated.

Given two men, A and B, of equal ability. A has had two years' practical experience in the field, but no special training in the laws of electricity. B has had two years' study and experiment with electricity with special regard to its use in the telephone, has learned the various actions of the parts of the telephone and the reasons for them. All this has been under the instruction of men experienced in the field as well as in the science of electricity, and by actual experiment with the telephone itself. Start these two men out under similar conditions. A, with his practical experience, will be better able to tell how to set a pole or an anchor and do the work well, but will find difficulty in explaining and handling something new that comes up. B, with his lack of practical experience, will have a more difficult time at first, but in the two years that follow will learn all that A knew and have the advantage of a quicker brain, a readiness in recognizing new things, and an ease in devising ways to overcome them. The student will be obliged to go through an apprenticeship in the field, he may have to learn to climb poles, but the term need not be long or tedious. And he will not be likely to stick there and fail to rise.

For this reason the school ought to devote its first and best energies to teaching thoroughly the fundamental principles of

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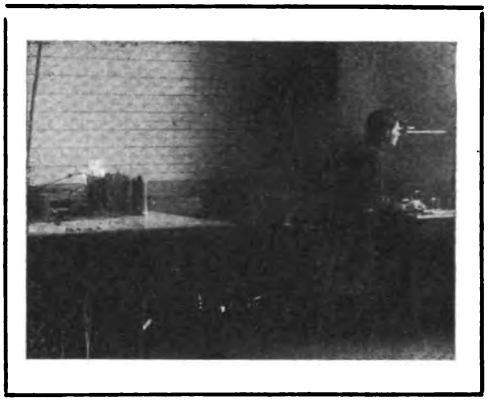
electrical and telephonic action. No part of the action of a telephone system should be obscure to the student. He should have such intimate contact with all telephonic operations that he feels perfectly at home with them. If this work is done in a properly equipped laboratory, it will include as a matter of detail many of the things that may be learned in the field.

This brings up the question "How fully shall the laboratory be equipped?" In a meagerly equipped laboratory the student has the limitations of too little apparatus and is handicapped by lack of means for carrying on experiments; but he will learn to be original, to do things for himself, to be independent, and often graduates of poorly equipped schools take creditable place beside those that come from more pretentious places. But the loss to the student from lack of apparatus can hardly be offset by the training in makeshifts.

On the other hand, it is possible so to surround the student with conveniences that he becomes unduly dependent on them and is at sea when he enters the practical field. He may have been accustomed to having neatly arranged and labeled apparatus, plenty of instruments, perfectly insulated circuits, and a laboratory assistant at his elbow. In the field he may find that he has no Wheatstone bridge, or perhaps no voltmeter, or that his test lines are leaky, and he may be at a loss to know what to do.

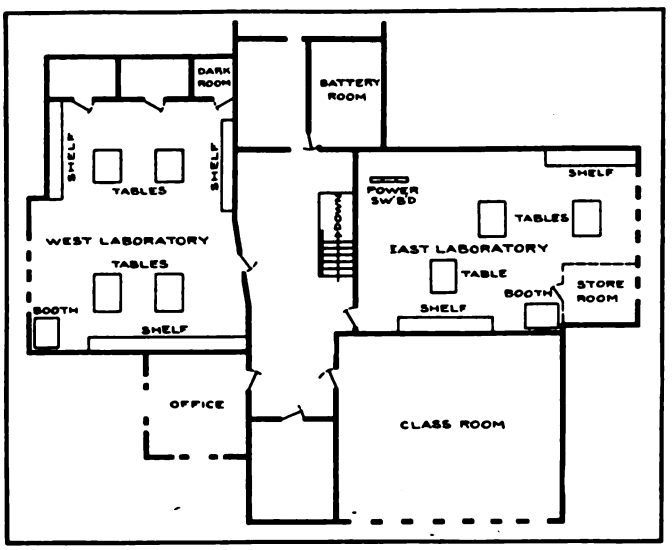
On one occasion, a college graduate was doing some work for his employers in a neighboring town. A local farmers' company was serving 35 or 40 subscribers from a switchboard in a residence. One of the lines was a bridging party line with fifteen instruments on it, all having 1,600 ohm bells. The ringing on the line was poor (the farmers ringing each other) and the resistance of the switchboard drop had been called in question. The contract under which the board was bought called for 1,600 ohm drops. The college graduate was asked to settle the question as to the resistance; but he had no Wheatstone bridge. The town was small, only 300 inhabitants, and not even a voltmeter was to be had. He took stock of available apparatus—a receiver, some dry cells and some wire. On inquiry it was found that the company had a series telephone in a store near by. This was procured. Carefully removing the insulation from a No. 22 copper wire, he stretched it between two nails driven in a board about four feet apart. To this improvised slide wire the battery, receiver, drop to be measured, and the series telephone were attached, forming a Wheatstone bridge circuit. The ringer of the series telephone was stamped "100" ohms and was assumed to be standard. The rest is plain, but not easy, for the click was very faint, and the range of quiet extended along the wire for several inches. The formula to be used was easily derived. The result was sufficiently accurate to show that the drop was a series one and the manufacturer was obliged to replace it.



Cable Testing in the West Laboratory.

With regard to the telephone laboratory, the wisest course is to avoid the two extremes and leave upon the student a certain burden of initiative, which will induce him to exert his wits. This has been the aim in the work at Purdue University.

The first object is to have on hand a sufficient assortment of modern telephone apparatus in the shape of keys, relays, transmitters, receivers, coils, complete telephones, etc., as made by the various manufacturers. These are to give the student a basis for his experiments; they are his tools, his material, and he learns to combine them to produce various results in much the same way that a manufacturer puts together the parts in making up a given order.



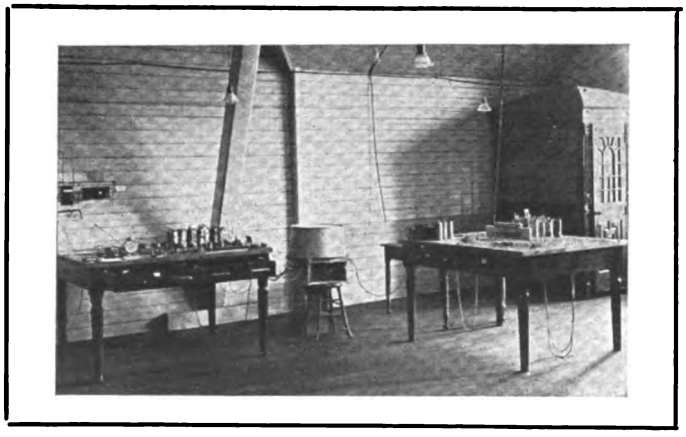
Floor Plan of the Portion of the Electrical Building occupied by the Telephone Department.

The second is the means for carrying on the experiments, consisting of an arrangement of work tables, work shelves, and booths, connected by a system of circuits to a switchboard, where connections may be made between the circuits as well as to the various sources of power.

The stock of apparatus includes all the standard parts for the assembly of almost any kind of telephone, local battery magneto to common battery and the automatic. Some of this is mounted on shelves as a permanent working exhibit, with which the student works, trying various combinations and the results of various troubles.

One of these working exhibits is a little magneto switchboard having two lines, each terminating in a self-restoring drop and jack. A single pair of cords, with clearing out drop and operator's set completes the board. These are wired up as nearly as possible in accordance with standard practice while allowing the student to see the arrangement of the circuits and study out their operation. One of the lines attached to the switchboard runs to a magneto telephone built up in skeleton form with every part in plain view, but wired up in working order. The wires are not bunched together, or run hidden or concealed, but so arranged that the beginner can see everything. The other line runs to a regular standard magneto telephone of the compact type, exactly such as used in the field.

Another working exhibit is a common battery switchboard of two lines, fully equipped with lamps, relays, operator's set, etc., working on the retardation coil system. One of these lines runs to a common battery telephone built up of parts and wired with



Part of the Equipment for Battery Testing, etc., West Laboratory, Purdue University.

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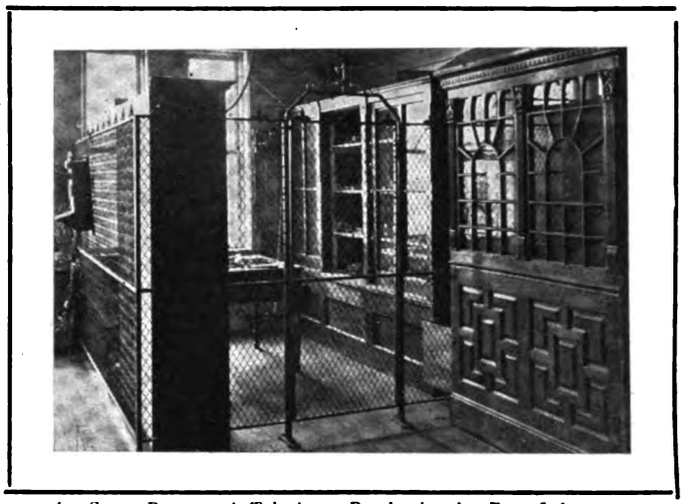
the object of making everything about it as plain as possible. The other line ends in a standard common battery wall telephone, to show the exact commercial form of instrument.

The rest of the apparatus is separately mounted on neat wood bases provided with binding posts and kept in a store room. These are issued to the students, on order, for combination in various experiments as directed by the instructions prepared by the head of the department.

The telephone department occupies a large portion of the third floor of the Electrical Building. There is a recitation room, an office, and two laboratory rooms known as the east laboratory and west laboratory. All the rooms are well lighted and present an attractive appearance.



The Store Room and Telephone Booths in the East Laboratory.

In the northwest corner of the east laboratory is located the power switchboard, consisting of three panels of black Monson slate, each panel being 1½" by 24" by 72". This board carries two hundred brass jacks, to which are wired all the circuits of the system. In the adjoining battery room is a set of thirty storage cells, of the unit type accumulator, made by the National Battery Company, of Buffalo, N. Y. Each cell is supported by a sand tray resting on insulators, which are carried by suitable wooden framework, all the wooden portions being thoroughly painted with acid-proof paint made by the Dearborn Paint Company, of Chicago. The thirty cells are connected to the switchboard jacks in seven groups, as follows: Two groups of one cell each, two groups of two cells each, three groups having five, seven and twelve cells respectively. This gives a range in voltage for all systems from local battery to automatic. In addition, the switchboard carries numerous knife switches, an I-T-E circuit breaker, two General Electric rheostats, and other instruments necessary for charging the battery and distributing the power. There are two sources of electric power, the main electrical engineering laboratory and the power house. Both can furnish either alternatng or direct current, and provision is made so that the telephone power board will always have both alternating and direct current from one or the other of the two places. The alternating current is especially valuable for induction experiments and exercises in the transposition of lines. Trunk lines are also provided for connection to the main electrical laboratory and to the standards laboratory, the latter being to secure access to the Rowland electro-dynamometer belonging to the department, which is mounted there for greater stability.

Each work table is located in a fixed position and has at its center a terminal board fastened on edge. On this terminal board are mounted line jacks, lamp jacks, drops, and whatever apparatus is best adapted for permanent location. These are all wired to spring binding posts, made by the Fahnestock Electrical Company, of Brooklyn, the arrangement being such that any desired connections can be quickly and easily made. Two or more switchboard plugs with cords are also attached to the table. The terminal board carries a row of spring binding posts, to which are attached all the circuits ending on that table. These circuits leave the power board in the form of a switchboard cable running in the attic. Over each table the wires for that point leave the cable and in the form of special Okonite wire drop straight down to the terminal board, where they are fanned out to the binding posts.

A system of numbers is applied to the wires, which enables any pair to be readily identified and has been found a great convenience at all times. The first digit of the number indicates the panel of the switchboard on which the terminals may be found, the second and third digits indicate the horizontal row on the panel, the rows being numbered from the top down. The last digit designates the pair of jacks in that particular row, numbering from left to right. Thus, if the student finds on his work table a circuit numbered 2113, he will find the other end of it on the second panel of the power switchboard, in the eleventh row and the third pair in the row. Each circuit is plainly tagged by a suitable number plate at each end.

All of the circuits are fused on fuse panels supported by a framework behind the switchboard. These fuses range from one to five amperes for the experimental circuits, and more for those carrying the heavier power. A small Roth ringing machine running on 110 volt direct current furnishes ringing current to the laboratory, giving straight alternating, positive and negative pulsating current. A multi-frequency vibrator is also available for experimental use, furnishing the four frequencies necessary for harmonic ringing.

Reference to the floor plan will show the arrangement of the rooms and the tables and shelves. There is space enough for comfortable work, and on many experiments in which it is necessary for the two students to be separated far enough not to hear each other's voices there is no difficulty in securing that end.

There is one thing, a very valuable thing, without which a laboratory is a dead place—atmosphere. It is this that makes new students feel at home and puts them to work with a will. It is this that makes old students enjoy their labors and be glad when vacation is over so that they may again take up the work. It is the possession of a true engineering atmosphere that makes the telephone department what it is.

A good, live telephone meeting every other Tuesday night is probably the best evidence of this atmosphere, especially when it is known that it was started by the desire of the students themselves. Speakers from the various companies of the city and other cities have addressed the students in these meetings upon live and interesting topics. These meetings are under the direction of the Purdue student branch of the American Institute of Electrical Engineers, of which all students are urged to become members. There are many advantages to student membership in the A. I. E. E. For the small sum of $3 per year the student has the possession of the proceedings of the institute, as well as attendance at all the meetings. Upon the termination of his school life, having passed to the commercial application of electricity as his life work, he may be transferred to the rank of associate member without the payment of any initiatory fee. He is thus admitted to partnership in a great work and the inspiration of being in touch with the world's greatest men.

For the young man who is merely "sent" to school and who wants so many "credits" to enable him to graduate, the telephone department has no place. But to the young man who wants to amount to something in life and is willing to work for it we extend a hearty welcome. The brilliant but lazy student is not "passed" if he does not do the work, yet no student, though weak, is critically rejected if he shows by his work that he is dead in earnest. Thoroughness is the standard.

A METHOD OF PRESERVING IRON AGAINST RUST.

IRON may be preserved against rust, says the *Inland Printer*, by immersing it for a few minutes in a solution of blue vitriol; then in a solution of hyposulphite of soda, acidulated with chlorhydric acid. A blue-black coating is thus secured, which is not affected either by air or water.

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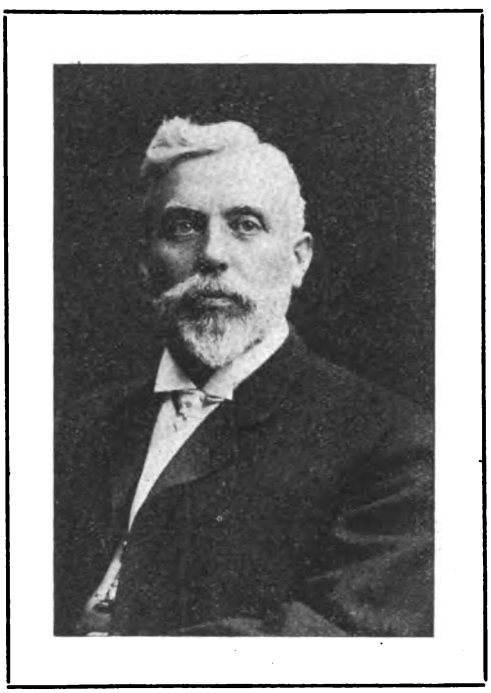
The Niagara Falls Convention

THE convention of the New York State Independent Telephone Association was opened in the large ballroom of the Cataract Hotel, Niagara Falls, at 10 A. M. on September 3 with President Howard Hendrickson in the chair. Approximately 300 delegates were registered, making a gathering which was creditable for even so well developed a State as New York.

F. J. McKenna, Corporation Counsel of the City of Niagara Falls, welcomed the delegates to the city in the absence of Mayor Cutler, and shared the hearty good will of the delegates with Mayor Slater, of Niagara Falls, Ont., who welcomed the delegates in behalf of the sister city across the gorge.

Response was made to these addresses of welcome by Judge A. R. Smith, of North Tonawanda, who called attention to the rapid progress made by the vigorous association which he represented. He said that three years ago it was organized with about thirty-five members, and to-day has ten times as many. The change from the times when a telephone was a luxury is shown by the fact that in the city of Niagara Falls there is a colored washerwoman who transacts her business by the Home telephone. Not only is the telephone now made available to all, but its use is growing tremendously. In Niagara Falls, during the month of February of this year, the Independent company put in more telephones than the Bell company had in the entire city prior to the coming of the Home company, and in the month of March the Home company installed twice as many instruments as the Bell had put in service during the twenty years prior to the beginning of the Indpendent movement.



Dr. W. R. Campbell, President of the New York State Independent Telephone Association.

After listening to these addresses business was taken up and an auditing committee, committee on membership, and nominating committee were appointed. The secretary read the minutes of the last meeting held in Albany, and they were approved after the committee appointed last year to attend the National Association meeting in Chicago had made its report. A committee was appointed to secure county maps of the entire State of New York. The plan adopted was to appoint one delegate representing each county, have him procure absolutely complete and reliable statistics of the telephones and lines in the county, both Bell and Independent, under a prescribed set of rules governing the method by which these maps should be prepared. When the work of every delegate has been accomplished the maps are to be returned to the committee, who will then have prepared one large map, forming a combination of the county maps and showing in detail the history, record and comparison of all lines, both Bell and Independent, in New York State.

General discussion arose relative to the advantages and disadvantages of rural lines; the best methods of operating them; and whether it was considered advisable to lavishly expend money in the construction of rural lines in the method now adopted by the Bell company, or whether it was possible to make such propositions a paying investment if followed out on the lines now adopted by the Bell company. It was generally conceded that a profitable method of handling rural business has not yet been devised and no suggestions of advantage in solving that problem could be secured from a study of the methods now being tried by the Bell company.

An intermission was taken for lunch, during which period ninety managers, identified with the Consolidated Telephone Company's interests, held a short session to exchange views on certain subjects. This meeting was opened by an address from the president, B. G. Hubbell, of the Consolidated company, who in his usual genial, kindly manner spoke of the high relation in which the telephone company placed the local manager to the business interests of the city in which he was residing, and made a few remarks on the general management of exchanges.

G. W. Gillette, attorney, made a few remarks on the taxation of telephone companies and its various phases.

J. D. Pugh, auditor, spoke on telephone accounting, making suggestions along the line of accuracy in accounts.

Hugh Taylor, cashier, spoke on finances.

B. L. Moore, general manager of the Frontier Telephone Company, spoke on the manner of securing toll business.

V. H. Calhoun, construction superintendent, spoke on the subject of local and toll line construction.

W. W. Kidney, chief engineer, spoke on the relation of the exchange manager to the factory.

G. H. Raymond spoke on the method of separating a man from his money in the manner of disposing of securities.

Addresses were also made by several of the directors of the Consolidated Telephone Company.

The progress, and the most excellent development of the Consolidated Telephone Company and its different subsidiary companies formed the basis for much pleasant comment.

Among those present were:

B. G. Hubbell, President; Byron L. Moore, General Manager of the Frontier Telephone Company; Hugh Taylor, Cashier; J. D. Pugh, Auditor; V. H. Calhoun, Construction Superintendent; W. W. Kidney, Chief Engineer; Lloyd E. Knapp, Sales Manager; S. F. Scheu, Purchasing Agent: Harry Gaul, Traffic Manager; G. W. Gillette, Attorney; Claude Ewing, Manager of Exchanges; Byron Daggett, District Manager; G. H. Raymond, Raymond Bissell, J. J. Johnston, F. Price, G. Barrett Rich, F. S. Schieferle, B. Christensen, W. H. Lamme, G. C. Keogler, L. E. Clark, C. N. Tackaberry, Virgil Hayden, William A. Wadsworth, M. A. Close, William Breese, F. C. Soop, Charles Duerr, Oscar Theisen, V. J. Davis, W. R. Garman, R. G. Logan, F. J. Dorn, H. R. Robertson, C. F. Cannon, Buffalo; F. W. Swift, Alden, N. Y.; G. H. Wilder, Akron, N. Y.; N. Reading, Attica, N. Y.; M. Cottrill, Arcade, N. Y.; W. G. Keller, Avon, N. Y.; T. W. Chase, Bath, N. Y.; P. L. Steves, Franklinville, N. Y.; H. E. Stevens, Corfu, N. Y.; A. J. Griffis, Cherry Creek, N. Y.; F. E. Mahon, Charlotte, N. Y.; F. A. Klock, Corning, N. Y.; J. J. Johnson, Clifton Springs, N. Y.; Horace C. Neil, Salamanca; L. D. Parsell, South Dayton, N. Y.; D. H. Young, Darien, N. Y.; J. M. Brogan, Dansville, N. Y.; F. A. Noble, Enfield, N. Y.; H. L. Green, East Aurora, N. Y.; W. W. Thomas, Friendship; L. W. Shipman, Gowanda, N. Y.; J. J. Clark, Holley, N. Y.; C. M. Briggs, Hamburg, N. Y.; V. Lillibridge, Honeoye Falls, N. Y.; C. M. Kelley, Hornell, N. Y.; L. B. Eaton, Le Roy, N. Y.; J. T. Coventry, Lima, N. Y.; Emory Smith, Livonia, N. Y.; B. P. Broephel, Moscow, N. Y.; E. E. Larham, Mt. Morris, N. Y.; H. W. Wightman, North Collins, N. Y.; S. A. Lane, Penn Yan, N. Y.; W. H. Collins, East Rush, N. Y.; W. I. Lamphere, Silver Creek, N. Y.; F. H. Brace, Springville, N. Y.; C. W. Brown, Wayland, N. Y.; H. A. Benedict, Wellsville, N. Y.; F. R. Hillhouse, Gowanda, N. Y.; F. K. Best, Fairport, N. Y.; C. E. Hawley, Geneseo, N. Y.; George Beebe, Friendship, N. Y.; H. F. Flint, Bath, N. Y.; S. F. Dye, Geneva, N. Y.; R. B. Fegan, Ithaca, N. Y.

The afternoon session started at 2 o'clock and the reports of the different committees were heard.

The officers elected for the ensuing year are as follows: Presi-

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dent, Dr. W. R. Campbell, Niagara Falls; vice-president, A. H. Cowie, Syracuse; secretary, R. Max Eaton, Niagara Falls (re-elected); treasurer, George R. Fuller, Rochester.

The executive committee is made up as follows: George R Fuller, Rochester; B. G. Hubbell, Buffalo; Edward Davis, Binghamton; S. P. Rawson, Albany; William B. Charles, Amsterdam; G. H. Poole, Utica; G. W. Pratt, Boomville; H. W. Fluhner, Auburn; J. F. Stockwell, Syracuse; I. H. Griswold, Plattsburg. The convention was addressed by President Hoge, of the National association, and by Secretary A. F. Wilson, of the Canadian association.

Under the head of new business was taken up various matters pertaining to railroads, permanent secretary, and other matters, after which the convention was addressed by Mr. G. H. Raymond, of Buffalo, on "Handling of Independent Securities," and reasons why Independent securities are more sought after by investors than those of the Bell Telephone Company were shown. Another interesting paper was the one dealing with "Standardization," which was read by L. E. Knapp, of Buffalo, while a paper on "The Kind of a Girl to Select for an Operator, and How to Train Her," by Miss Dempsey, chief operator of the Frontier Telephone Company, was read by Manager Belanger, of Schenectady.

In the evening a large banquet was given at the International Hotel, at which the newly elected president acted as toastmaster. Good music and entertainment was provided and speeches, bubbling with wit and good fellowship, were made by Franklin J. McKenna, corporation counsel, Niagara Falls; Mayor Robert Slater, Niagara Falls, Ontario; J. Harvey Ferris, Utica; Judge Smith, of North Tonawanda; Major Fraser, of the Canadian volunteer militia, of Brantford, Ontario. Three cheers were given for Teddy Roosevelt, and His Majesty, King Edward.

During the banquet a visit was received from the officers of the Dufferin Rifles, of Canada, attending in their full military uniform. This was a return by them to the visit of a large delegation made by the telephone men to their camp across the river, early in the evening. The officers had entertained royally the visiting telephone men at their headquarters on the camp ground.

The local telephone company had made quite generous preparations for the visiting delegates, and large banners bearing the Independent emblem and shield could be seen exposed in numerous parts of the streets around the city. The shield was everywhere in evidence and the delegates were made to feel quite at home by the sight of the familiar device. One of the agreeable features of the reception accorded the delegates was contributed by Miss Stacia Baker, of the Niagara County Home Telephone Company, who distributed the souvenir postal cards showing the "New Maid of the Mist," and programs of the convention, and delighted all by her wit and vivacity.

R. M. Eaton, Re-elected Secretary of the New York State Association.

MANUFACTURERS' EXHIBITS AT CONVENTION OF N. Y. STATE INDEPENDENTS.

Manufacturers of apparatus and specialties used by telephone companies were well represented at the annual convention of the New York State Independent Telephone Association, and most of them had interesting exhibits in the parlors of the Cascade Hotel at Niagara Falls.

George R. Fuller.

Among those represented were the following:

W. N. Matthews & Bros., St. Louis, Mo., represented by V. L. Crawford. Mr. Crawford exhibited in addition to the well known Stombaugh Guy Anchor, the new Hargis Cable Splicing Joints, a comprehensive illustrated description of which appeared in the September 1st issue of the JOURNAL. The telephone operators in attendance evinced great interest in the new device.

Evan S. Shelby, sales manager of the Sterling Electric Company, Lafayette, Ind., had a comprehensive exhibit of Sterling telephones, parts and protectors. The well known Sterling trade mark was much in evidence and Mr. Shelby was kept busy explaining the good points of the company's apparatus. Especial interest was manifested in the complete line of exchange and substation protective devices displayed.

The Automatic Electric Company, of Chicago, was represented by C. L. Fisher.

G. W. Rodormer, of the American Electric Fuse Company, Muskegon, Mich., was in charge of an exhibit of new fuse productions.

Frank B. Cook, of Chicago, exhibited pole top terminals, his various types of central office and substation protectors, and Cook's self-welding wire joint. F. W. Pardee, general manager, and S. C. Platt, salesman, entertained visitors.

The Century Telephone Construction Company, of Buffalo, had a very good exhibition of Century telephones, both magneto and common battery, switchboards, telephone parts, etc. Representing the company were: B. G. Hubbell, B. L. Moore, L. E. Knapp, F. Schiferele, B. Christiensen, S. F. Thy, F. J. Goodman, C. L. Cannon, L. E. Clark, and M. A. Close.

S. B. Rawson, R. Davis, and E. Krause represented the Dean Electric Company, and displayed a number of types of Dean apparatus, parts, etc.

Williams Telephone & Supply Company, of Cleveland, Ohio, was represent by C. W. Hunt, general manager. The Williams Company has redesigned its apparatus, and has brought out a number of new features and devices which were pronounced good.

The American Automatic Telephone Company, of Rochester, N. Y., represented by J. W. Lattig and Chas. L. Goodrum, was one of the centers of interest on account of the automatic system put on the market recently, which embodies many features radically new and important.

F. W. King and E. A. Tyler were in charge of the exhibit of the Stromberg-Carlson Telephone Manufacturing Company, Rochester. They displayed a line of standard Stromberg-Carlson Telephones.

The Ericsson Telephone Company, which is constructing a new factory in Buffalo, was represented at the convention by Jos. Power.

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T. B. Miller, of the Miller Anchor Company, had a line of samples of this well-known anchor.

The F. Bissell Company, Toledo, Ohio, had an exhibit of Security specialties in charge of A. F. Knierim. He presented a set of souvenir postal cards depicting certain adventures of the "Frog," which is the trade mark of the concern, to visitors.

The Wire & Telephone Company of America, Rome, N. Y., was represented by F. M. Potter, Jr. Mr. Potter was formerly manager of the Independent plant at Syracuse, N. Y., and is the inventor of a number of specialties.

J. G. Ihmsen, general manager of the American Electric Telephone Company, Chicago, showed a line of telephone samples.

The Kind of a Girl to Select for an Operator and How to Train Her*

By Miss Dempsey, Chief Operator of the Frontier Telephone Company, Buffalo.

THE following suggestions concerning the selection of operators relate to those qualities, the possession or lack of which make or mar the service in the average exchange. While it is desirable to secure the best help possible under any circumstances, greater care should be exercised in selecting operators for the smaller offices, where so much is left to the discretion and common sense of the operator. It is fortunate indeed that not only on account of there being fewer opportunities of obtaining employment in the smaller towns, but because of the difference in the cost of living, it is easier, as a rule, to secure a class of well educated and capable young women at the wages offered, superior perhaps to the majority of those to be found in the cities.

Physical fitness, mental capacity and even temperament are the three prime requisites to be sought when selecting operators Good health insures regular attendance, and upon this the uniformity of the service rendered is largely dependent. Keen, accurate eyesight is very essential. By this it is not meant that applicants wearing glasses would be invariably rejected. On the contrary, if after a brief test, the sight with the use of lenses is found to be reliable, other things being equal, the applicant would be accepted.

Simple tests of the applicants' hearing should also be made. This can be accomplished by noticing whether the usual questions, asked in an ordinary tone, are answered readily, or whether it is necessary to repeat them. Another convenient way is to ask questions over a telephone and note the results.

An indispensable asset of a telephone operator is a pleasing voice. This should not be construed as implying that all young women who seek employment as telephone operators need have at the beginning voices suitable for exchange work, but with voices of ordinary quality it is rarely found impossible to acquire the desired modulation and tone. As a consequence of the natural nervousness a student feels when she is first launched forth to answer calls alone, her voice is often loud and even harsh, and only by careful, painstaking practice is this difficulty overcome. During an experience of a number of years, out of several hundred applicants examined, it was found necessary to reject only four on account of their voices.

An operator should possess good judgment, tact and the ability to think and act quickly in emergencies. These qualities, while not always apparent in the possessor at the beginning, are sure to manifest themselves from day to day in the routine work of the exchange. In the average office, where the duties of operator and chief operator often devolve upon one person, their value cannot be over-estimated. From the first, operators should be impressed with the importance of regularity in attendance. At Buffalo this is always made one of the strong points in examining an applicant, from whom is exacted a promise of steady and faithful work.

When an operator is unable to report for duty, a message by telephone or otherwise, advising of the circumstances, should be required at least one hour previous to the time the operator is scheduled for work. Then, if a substitute is necessary, ample time is afforded to make the arrangement. One method of promoting a uniform attendance is to arrange to excuse operators from duty one day during a given period, say the week following their long Sunday shift. This gives the operators an opportunity to shop and attend to other personal affairs, and it is found to be much better to permit a systematic absence and arrange for it, than to be compelled to operate with a force of unreliable attendance.

(*To be continued.*)

*Abstract from paper read at the convention of the New York Independent Telephone Association.

SPANISH GOVERNMENT TAKING UP THE CONSIDERATION OF IMPROVEMENTS IN NATIONAL SYSTEMS OF COMMUNICATION.

THE latest issued of the United States Consular Reports contains a statement that the Spanish Government at Madrid has appointed a commission to report on the adoption of various devices for improving the Spanish telephone and telegraph services, such as the establishment of a higher school of telegraphy, simplification of the telegraph regulations, development of the telephone system, purchase of modern material, and acceleration of the delivery of telegrams, more especially those intended for the newspapers. The commission is to report by October 1, in order that the necessary reforms may be begun as soon as possible.

BLAMES TELEPHONE FOR TOO NUMEROUS NAMES.

ONCE again the much berated telephone is called to task, this time being held responsible for a man being known by five different names and causing an entanglement which puzzled officials of several hospitals and a coroner.

On April 21 George Marecit, also kown as George Wastreb, entered a hospital in Pittsburg suffering from injuries sustained in a quarrel. He was entered under the name of George Maralief. He was discharged on May 10 and on August 13 died at another Pittsburg hospital, under his own name.

The hospital authorities telephoned to the undertaker to take charge of the body, and here the trouble began, for he was unable to understand the name and guessed it to be Anthony Bensito, and, accordingly, a death certificate was made out in that name.

The body was taken to the cemetery, and it was explained there that the name on the certificate might not be correct. Telephonic communication with the hospital caused the body to be buried under the names of "George or Anthony Morisath," and the matter was forgotten. Later, when the man with whom he had quarreled was arrested, suspected of his murder, a search was made for the body by the coroner, and it was finally discovered in the cemetery. The coroner then attempted to straighten out the five names and concluded that indistinct telephone conversations were responsible for all the trouble.

STRANDED VESSEL AT HONOLULU CONNECTED BY TELEPHONE.

THE quality of alertness to seize an opportunity is not lacking among telephone men in Honolulu. It is reported that a few days ago when the steamship Manchuria became stranded the officials of the telephone company visited her immediately with a proposition to run out a wire which would give her passengers an opportunity to talk to people ashore whenever they wished.

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IN THE OPERATING FIELD

TEXAS INDEPENDENT TELEPHONE MEN HOLD WELL ATTENDED DISTRICT MEETING.

TELEPHONE men in districts Nos. 1 and 2 of the Texas Independent Telephone Association met in Greenville, Texas, on Sept. 6th and elected the following officers: E. M. Chamberlain, Greenville, president; G. M. Daniels, Lone Oak, vice-president; E. Graham, Paris, secretary and treasurer.

On roll call the following-named companies were found to be represented: Grayson County Telephone Co., Sherman, C. A. Shock, manager, operating 2,100 telephones; Citizens' Telephone Co., Paris, E. Graham, manager, operating 950 telephones; Farmers' Telephone Co., Rockston, McD. High, manager, operating 375 telephones; Three P. Telephone Co., Wolf City, J. W. Seigler, manager, operating 20 telephones; Blue Ridge Independent Telephone Co., Blue Ridge, A. A. Seigler, manager, operating 30 telephones; Cumby Telephone Exchange, Cumby, J. W. Martin, manager, operating 159 telephones; Citizens' Telephone Co., Lone Oak, G. M. Daniel, manager, operating 400 telephones; Home Telephone Co., Greenville, E. M. Chamberlain, manager, operating 800 telephones; Van Cleve Telephone Co., Kingston, Geo. W. Van Cleve, manager, operating 225 telephones; Wills Point Independent Telephone Co., Wills Point, Mr. Fink, manager, operating 315 telephones; Texarkana Telephone Co., Texarkana, John B. King, manager, operating 1,520 telephones.

The State of Texas is so large that it was divided into seven districts a year ago by the Texas association. No district is less than 100 miles wide by 200 miles long, while the largest district is about 600 miles wide by 600 miles long.

The meeting on the 6th was the first time that any of the districts have been called together. It is the idea for each district to meet at least twice a year, regardless of the regular association meeting, and it is believed much good will result as the district meetings will bring out men who can not afford to travel the required distance to attend the regular meetings.

As a result of this meeting it is expected that a number of interested ones will club together and put up 160 miles of No. 10 copper line which is badly needed in Northern Texas.

MEETING OF THE CANADIAN INDEPENDENT TELEPHONE ASSOCIATION.

DELEGATES from many points in Ontario, Quebec and Manitoba, and visitors from Michigan, Ohio and New York, attended the first annual meeting of the Canadian Independent Telephone Association, held at Toronto on September 5th.

President Alph. Hoover, of Grand River, was in the chair, and after acknowledging the welcome, introduced Hon. Colin Campbell, attorney-general of Manitoba, who explained that the attitude of his government was to aid the Independent movement by endorsing the bonds of municipalities in that Province which by vote next December showed that they wanted to establish lines of their own. By endorsing bonds the government would help them to get money at a low rate.

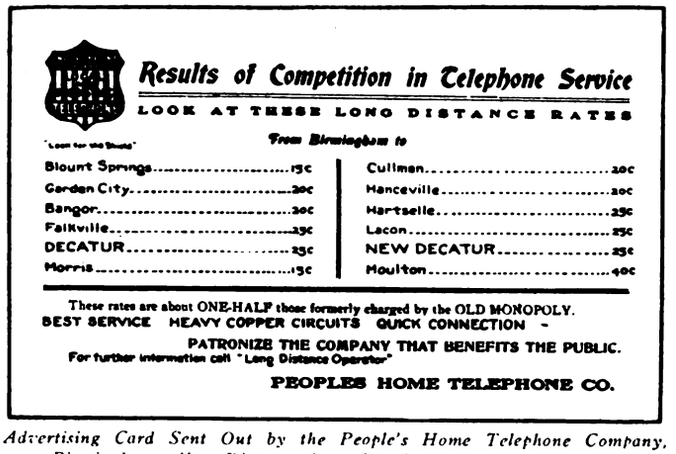
At the conclusion of his address the report of the secretary, Mr. A. F. Wilson, of Markham, was read. It gave the following figures to show the rapid strides of the Independent movement in Canada: Number of absolutely Independent companies, 73; number of shareholders, 3,248; number of subscribers, August 15, 1905, 6,427; number of subscribers, August 15, 1906, 12,073; increase in one year, 5,646; capital invested, $850,000.

Papers were read by James B. Hoge, Dr. W. Doan, of Harrietsville, and F. Dagger, of Toronto, and addresses were made by Mr. F. D. Mackay, vice-president of the association; Mr. R. Y. Ellis, Toronto Junction; Dr. T. F. Demers, Levis, Que.; Dr. Ochs, Hespeler; Mr. C. Skinner, Sherbrooke; Mr. C. J. Thornton, Kirby; Mr. A. F. Wilson and many others.

As a result of the strong address of James B. Hoge, president of the International Independent Telephone Association of America, in which he invited the Canadian associations to affiliate themselves with the national association of the United States, a resolution was passed favoring the affiliation.

The following officers were re-elected for the ensuing year: President, Alph. Hoover, Green River, Ont.; first vice-president F. D. McKay, Toronto; secretary-treasurer, A. F. Wilson, Markham; executive committee, Dr. T. F. Demers, Levis, Que.; Dr. W. Doan, Harrietsville; C. J. Thornton, ex-M.P., Kirby; Dr. Ochs, Hespeler; Richard Vigars, Port Arthur; Dr. E. Hart, Brantford; Levi Mayer, Beamsville, and F. Dagger, Toronto, and C. Skinner, Sherbrooke, Que., who are newly elected.

Manufacturers of telephones and supplies were well represented, the register showing the following names: G. F. S. Bauer, Century Tel. Construction Co., 53-59 Adelaide street W., Toronto, Ont.; E. B. Overshiner, Swedish-American Tel. Mfg. Co., Chicago, Ills.; J. A. Wentworth, Swedish-American Tel. Mfg. Co., Chicago, Ills.; W. E. Campsall, Swedish-American Tel. Mfg. Co., Chicago, Ills.; F. W. Pardee, Frank B. Cook, Chicago, Ills.; H. A. Nutall, Century Tel. Construction Co., Toronto, Ont.; P. B. Yates, Gould Storage Battery Co., Toronto, Ont.; Frank T. Hodgins, The R. E. T. Pringle Co., Toronto, Ont.; J. W. Fletcher, The R. E. T. Pringle Co., Toronto, Ont.; H. C. Randall, Chicago Tel. Supply Co., Elkhart, Ind.; Geo. W. Brown, Chicago Tel. Supply Co., Elkhart, Ind.; Evan Shelby, Stirling Electric Co., LaFayette, Ind.; J. S. Gibson, Stromberg-Carlson Co., Rochester, N. Y.; R. Hendrickson, North Electric Co., Cleveland, Ohio; G. R. Rodormer, American Electric Fuse Co., Muskegon, Mich.; C. W. Hunt, Williams Tel. Supply Co., Cleveland, Ohio.


Results of Competition in Telephone Service
LOOK AT THESE LONG DISTANCE RATES
From Birmingham to
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Garden City 20c
Bangor 20c
Falkville 25c
DECATUR 25c
Morris 15c
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Hanceville 20c
Hartselle 25c
Lacon 25c
NEW DECATUR 25c
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These rates are about ONE-HALF those formerly charged by the OLD MONOPOLY.
BEST SERVICE HEAVY COPPER CIRCUITS QUICK CONNECTION
PATRONIZE THE COMPANY THAT BENEFITS THE PUBLIC.
For further information call "Long Distance Operator"
PEOPLES HOME TELEPHONE CO.

Advertising Card Sent Out by the People's Home Telephone Company, Birmingham, Ala. Distance from Birmingham to New Decatur is Eighty-six Miles.

OBITUARY.

ON August 28th Mr. Harry G. Hare died, of heart failure, at Dallas, Tex. Mr. Hare was well known to telephone men in the States of Ohio, Florida and Texas. He had shown exceptional ability as a wire chief and a general construction man, and his bright, active mind had brought him to the front in the ranks of telephone engineers.

Such were his disposition and abilities that all persons with whom his business brought him in contact became his friends. Even under the most trying conditions his conduct always won the appreciation and respect of his associates. His untimely death leaves a vacancy which will long be felt.

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THE EDITOR'S PAGE

A GOOD EMPLOYEES' MEETING.

AT the Niagara Falls convention the showing made by the employees of the Consolidated Telephone Company was a striking feature. In the neighborhood of one hundred men were present. When the special meeting of this large body was held it was attended by not merely men from all departments of the company, and managers from every district in which it operates, but by the president and a number of directors. Not only were there addresses, but a talk, which, although brief, was interesting and practical, was given by the head of every department. Mr. Hubbell, president of the company, spoke enthusiastically of the work which is being done, and several of the directors addressed the meeting.

This gathering is more significant from the fact that it brought together men from different parts of a very large territory, and strengthened the pleasant relations existing between those whose duties ordinarily keep them from getting into close touch with one another.

When it is realized that many of the directors who spoke at this meeting are among the most prominent and successful men of the State of New York, one reason for the success of this company is made clear. Enthusiasm and interest in the work of the company and the success of the meeting were in the strongest evidence, and every one, from the office boy to the president, was having a good time. The Consolidated company has set a good example to its neighbors in many ways, and in this meeting its men have well lived up to their reputation.

THE HOME OPERATOR.

IN another part of this issue are printed the most excellent suggestions relating to the selection of a telephone operator which were prepared by Miss Dempsey to be read at the meeting of the New York Association. In connection with this subject there is one additional point which is of the utmost importance. This is the personality of the applicant. This deserves the most careful and thorough consideration in the smaller communities. In such places the operator is, or soon becomes, an acquaintance of all the subscribers. Her relations with them must accurately represent the attitude of the company, for it is by her work more than anything else that the company is judged. It is not merely that the operator is the one who delivers the goods, that is to say the service, which the company has to sell, but she is in reality to a large extent its producer. This makes it essential that she should have to an even greater degree than the operator in a large city those qualifications which will enable her to handle connections with speed and accuracy. Here she has an opportunity to demonstrate her worth, but to no greater extent than in the handling of the many trifling affairs which do not properly form a part of her routine.

Every manager in a small town is familiar with the numerous opportunities for performing little personal services which are thrust upon his operators. For instance the doctor is in the habit of telling her where he will be at a certain time, and relying upon her to direct calls to the line of a patient so that he may receive them without delay, or the lawyer may notify her when he leaves his office, and tell her when he will return. The operator who can handle these little things tactfully and well soon gets to be a friend of the people she aids, and produces in return a most friendly feeling toward the company she represents. Such an operator is as valuable as she is hard to find.

In selecting a new operator to fill such a place, candidates should be considered fully as much from the point of view of the relation of the operator to the community as of her relation to the company. It is very likely that she will come to learn many things that those who use the lines do not care to have go too far, and it is easy for little things to happen which will arouse in the minds of some subscribers the suspicion that such knowledge is sought in the telephone exchange. For this reason, if no other, she should be a person whose discretion can be relied upon. There is nothing which will do more to cut down the use of the residential lines than the belief that the listening key remains thrown a little too long after conversation is started.

The ability to become acquainted with a few of the little traits of her subscribers which it is worth while for one in her position to know, and to make good use of this knowledge, is another characteristic of the successful operator in a small exchange. Instances innumerable to confirm these impressions of conditions which are so different from those prevailing in large business centres can be given by managers in all parts of the country. The wise manager realizes that his operator is about the most important person in the company, and is not content until he finds a person who will successfully carry on all the important duties which fall upon the person who is in charge of the "central" point for all the conversation of the town.

CANADA'S WONDERFUL INDEPENDENT TELEPHONE GROWTH.

ENTHUSIASM in Canada's convention was spontaneous enough to suit the most critical. Nothing forced or artificial about the spirit of these men! It was a big meeting, and nearly everyone seemed to bring with him the same spirit he has applied to his work. That was all that was required to make it a good convention.

The thing uppermost in the minds of the delegates seemed to be wonder at what the other fellow was doing. Each man wanted to know how he came to have so many good neighbors, and how it was that they were so big without his knowing it. After the figures were read the power—the present power and the great prospective strength—of the Independent telephone movement in Canada were made more clear.

The number of telephone men from the United States who were at the convention is notable. As the Independent movement in Canada grows the value of connecting the systems of the two countries is sure to assume greater prominence.

TERRIBLE TELEPHONY.

RECENTLY the editor of a Kansas City newspaper accepted the following highly interesting item:

"For experimental purposes," said a scientist, "I once allowed my body to be used as a telephone." He shook his head sadly. "No more. Never again," he said.

"The moment I grasped in either hand the broken edge of wire, I felt a severe shock and groaned aloud.

"The speakers were three miles apart. That first shock was nothing beside the one which followed the start of their conversation. Each syllable cut through my vitals like a knife. With a grunt of agony I fell to the ground, and, as the talk continued to penetrate me, my muscles jumped and wriggled like maddened snakes."

There is more of it, but we spare our readers. If any night operator has ever listened to a conversation which could do more than this we should like to know what it was about.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

COLLECTING ASSESSMENTS FROM STOCKHOLDERS.

What is the best way for a rural telephone company, unincorporated, in the state of Iowa to collect assessments from its stockholders who refuse to pay? Kindly cite the law on the subject. W. S. M.

IN case of the non-payment of an assessment your unincorporated company has the same two courses of action open to it that an incorporated company would have. It may either bring an action against the stockholder to collect the unpaid assessment or it may forfeit the delinquent stockholder's membership in the company. Troy Turnpike Co. v. McChesney, 21 Wend. (N. Y.) 296; Herkimer Mfg. Co. v. Small, 21 Wend. (N. Y.) 273. The right of expulsion may be based upon a violation of such of the established rules of the association as have been subscribed or assented to by the members and expressly provide for the expulsion of any members who have been guilty of the violation of such rules. Durel v. Perseverance Fire Co., 47 La. Ann. 111, 17 S. 591; Otto v. San Francisco Journeymen Tailors' Protective Union, 75 Cal. 308, 17 P. 217, 7 A. S. R. 156. If your articles of association do not provide for the expulsion of such members as do not pay their dues, your delinquent member could not be expelled, but your remedy would be by suit against him. An association being only a collection of individuals, it could not at common law sue by its own name and an action brought by such an association must be brought in the names of all the individual members. Pipe v. Bateman, 1 Ia. 369; Nightingale v. Barney, 4 Green (Ia.) 106. There are authorities holding that suit might be brought by the officer who is entitled to the property in controversy, and under such a ruling the treasurer would be entitled to sue alone for assessments payable to him. The treasurer's right to sue alone would depend a good deal on the laws of your company. Such a ruling has never been made in Iowa, but has in the neighboring state of Nebraska. Eben v. Bonacum, 38 Neb. 577, 57 N. W. 288.

CONSTRUCTION OF MINNESOTA GROSS EARNINGS TAX LAW.

TELEPHONE companies in Minnesota have heretofore been escaping considerable taxation by reporting fees secured through contract use of other companies' offices as expense instead of earnings. The matter has been brought to the attention of the Attorney General of the state and he has rendered an opinion unfavorable to the companies. One of the situations brought to his notice was the following:

Instead of the Northwestern Telephone Company having its own operators and equipment at Winnebago City, Minn., it employs the Blue Earth Valley Telephone Exchange Company to act as its agent and pays it a terminal or connecting fee of 10 cents a message on all business coming from points on the Northwestern Telephone Company's lines. The charge for a one-minute day message from Minneapolis to Winnebago City is 40 cents. The Northwestern Telephone Company only pays a tax on 30 cents, claiming that the 10 cents which it turns over to the agent, i. e., the Blue Earth Valley, is to be reported by it as a part of the gross receipts, but this is not done. The books of account of the Northwestern Telephone Company show the 40 cents as a part of the general income and the 10 cents terminal charge is handled as an expense and might be classified the same as the salary of one of the employees.

The attorney general holds that the 40 cents which the Northwestern Company collects is a part of its gross earnings and should be reported as such by the company for taxation; and that the 10 cents paid by it to the Blue Earth Valley Telephone Company becomes a part of the gross earnings of the latter company, and should be reported by it for taxation.

Another situation was as follows: The charge for a one-minute message from Winnebago City to Minneapolis is only 30 cents. The Blue Earth Valley Telephone Company makes the collection and remits the same to the Northwestern Company and the latter reports this sum for taxation purposes. Subsequently it pays the agent (the Blue Earth Valley Company) a commission of 20 per cent. for handling this business. On the books of the Northwestern Company this commission is classified as part of the expenses. It is not deducted from the gross earnings returns to Minnesota, nor is it returned for taxation purposes by the Blue Earth Valley Company.

Here the question arose: Can the state (in accordance with chapter 314, General Laws 1897) impose a tax on 30 cents received by the Northwestern Telephone Company, and also compel the Blue Earth Valley Telephone Company to include in tax return the commission of 20 cents, or 6 cents? The attorney general answered this question in the affirmative.

RULES FOR FOREIGN CORPORATION CONDEMNING A RIGHT OF WAY.

THE Cumberland Telephone and Telegraph Company, organized under the laws of Kentucky, instituted suit to expropriate a right of way over the right of way of the St. Louis, Iron Mountain and Southern Railway Company from Monroe to Alexandria, La. The plaintiff introduced all the testimony necessary to show that it had been legally incorporated except certain essential statutes. The defendant contended that the plaintiff had failed to prove its legal incorporation, while the plaintiff contended that the court of Louisiana should take judicial notice of the Kentucky statutes which it had omitted to prove. The Supreme Court of Louisiana held that a corporation organized under the laws of another State, which seeks to expropriate a right of way, must prove the regularity of its organization and that courts will not take judicial notice of statutes under which a company is organized not offered in evidence and not proven. The court therefore reversed a judgment for the telephone company. Cumberland Telep. & Teleg. Co. v. St. Louis, I. M. & S. Ry. Co., 41 S. 492.

NOT COMMON CARRIERS AS TO MESSENGERS.

IT has been held by the Supreme Court of New York that a telegraph company which maintains a staff of messenger boys which it furnishes to its patrons is not a common carrier as to the services furnished by the messengers. This decision applies with equal force to telephone companies that maintain a staff of messengers. The American District Telegraph Company of the city of New York maintains a staff of messenger boys which it furnishes to persons needing their services, making a charged based upon the time employed. The plaintiff told the manager of one of the offices that he wanted a boy and accepted one who was offered to him, and delivered to the boy a package containing $500 in money, with instructions to deliver it to the Rutherford National Bank of Rutherford, N. J. The money was never delivered and neither the plaintiff, the bank, nor the telegraph company has ever seen the boy since. The plaintiff sued the company for the amount of money lost. The court held that the company was not a common carrier and that the facts did not show a contract between the plaintiff and the company for the delivery of the package rendering it liable on failure of the boy to make the delivery. Hirsch v. Amer. Dist. Teleg. Co., 98 N. Y. S., 371.

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TELEPHONE PATENTS

PORTABLE TELEPHONE.

Will A. Shimer, Rochester, N. Y., patents (No. 821,753; dated May 29, 1906; filed October 3, 1905; serial number 281,156) a portable telephone.

In this invention a desk stand is provided with an enlarged base, which includes a reel. This reel is of the automatic type, being controlled by a spiral spring. The inventor intends that upon it shall be wound a telephone cord of the regular type to the length of about 30 feet. When it is desired to move the telephone to a distance from the point to which the cord is attached, the cord may be unwound from the reel. The action of the spring which tends to wind up the cord is prevented by a retaining linkage which holds the reel in a stationary position when the receiver is on the hook. Various devices which contribute to the proper operation of this plan are provided in connection with the main features.

EAR MUFFLE.

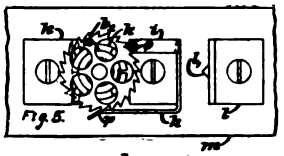
Julius R. Engelman and Otto Partenheimer, Jersey City, N. J., patent (No. 827,719; dated Aug. 7, 1906; filed April 11, 1906; serial No. 311,175) an ear muffle.

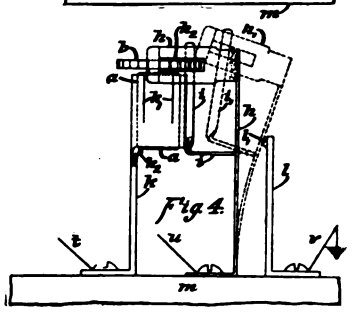
This invention relates to an ear muffle which may be provided with a pencil which serves either as a handle or for writing. The cup is designed to contain a disinfectant.

HEAT COIL.

Frank B. Cook, Chicago, Ill., patents (No. 817,160; dated April 10, 1906; filed Nov. 14, 1903; renewed Feb. 6, 1905; serial No. 244,318) a heat coil.

The object of the inventor is to provide an automatic self-

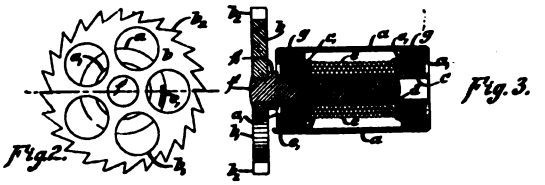




soldering coil which may be reset immediately without the renewal of any of its parts. Fig. 2 shows an end view of the heat coil. Fig. 3 is a longitudinal section, and Fig. 4 is a side view in connection with its supporting and operating springs. Fig. 5 is a top view of Fig. 4. The resistance coil *e* has a hollow core and the shaft *f*, which carries the ratchet *b*, is inserted into this core and held firmly by a heat-susceptible substance *d*. The terminals of the winding are connected, respectively, to the shell *a* and to the core *c*. The spring *h* engages the ratchet as shown in Fig. 4 and Fig 5, as does also the spring *i* which is part of the spring *h*. Both of these springs tend to revolve the ratchet counter-clockwise. Spring *k* is, however, provided with a lug *k'* which is used as a stop for the casing *a* and prevents it from turning under the action of springs *h* and *i* under normal conditions.

The circuit through the device is from conductor *t* through spring *k*, casing *a*, winding *e*, spool *c*, heat-susceptible material *d*, pin *f*, wheel *b*, and springs *h* and *i* to conductor *u*.

Any abnormally strong current will heat the coil, softening the heat-susceptible substance *d*, and allow the ratchet to revolve. The spring *h* is thus released and the circuit broken and line



grounded. To reset the device it is only necessary to re-engage the spring *h* with the ratchet after the heat-susceptible substance has cooled.

DIVIDED MULTIPLE SYSTEM.

John H. Lendi, Chicago, Ill., patents (No. 820,803, dated May 15, 1906; filed Oct. 27, 1902; serial No. 128,854) and assigns to the Kellogg Switchboard and Supply Co., Chicago, Ill., a two-division telephone system.

The objects of this invention are to provide means for operating a system of this type with a common battery located at the exchange and also to simplify the apparatus at the exchange and sub-station.

Every telephone instrument is provided with two keys each adapted to close a circuit through a relay employed to control the line lamp signal at its associated division. One of the keys when operated, grounds one side of the circuit and the other short circuits it. The relays are so designed that the subscriber may cause either one to operate, depending upon the position of the key in the sub-station set.

AUTOMATIC APPARATUS.

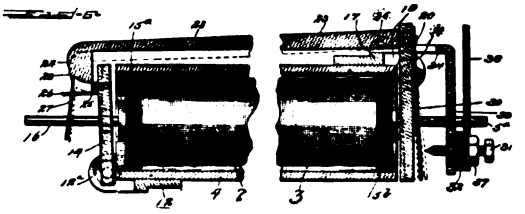
Alton E. Stevens, Fall River, Mass., patents (No. 816,948; dated April 3, 1906; filed July 12, 1905; serial No. 269,429) a controller for automatic telephone systems.

This patent relates to the sending mechanism and discloses mechanical details for the construction of a device which employs keys or push buttons in place of the usual dial mechanism. These keys are arranged in a similar manner to those upon the key board of a typewriter and are so adjusted that all have a uniform movement.

SIGNALING DEVICE.

H. P. Clausen, Chicago, Ill., patents (No. 829,628; dated August 28th, 1906; filed April 1st, 1901; serial No. 53,767) and assigns to American Electric Telephone Company, a signaling device.

The invention refers to a signaling device or relay of the self-



restoring type, and has for its object the simplification of instruments of this class, whereby they will consist of but few parts, be efficient in operation, and cheap to construct.

Fig. 1 is a side elevation of the relay. Figs. 4 and 5, elevational views of the main-coil and restoring-coil ends of the magnet,

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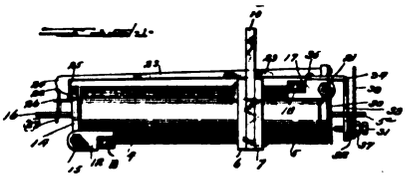
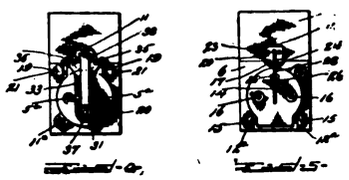
respectively, and Fig. 6 is an enlarged sectional view showing the operation of the armatures and contacts.

The operation of the device is as follows: When the actu-



ating coil 2 draws up its armature 14 the latch 23 falls from the screw 25, and the contact on screw 31 at the other end of the relay is closed. When the restoring coil is energized it lifts latch 23, and the spring 27 engages with loop 26, attached to the armature 14, and draws this armature from its position against the pole of the magnet, thus restoring the screw 25 to its position under the latch.

Ordinarily gravity would draw the armature 14 away from



this magnet, but the lug 27 is provided in case any residual magnetism should cause it to stick to the pole. The terminal wires 16 of the coil pass through apertures in the armature as shown in Fig. 5 and act as stops.

COMMUNICATING SYSTEM.

Alex. M. Stark, Toronto, Canada, patents (No. 819,095; dated May 1, 1906; filed Aug. 9, 1902; serial No. 119,128) and assigns to the Stark Elec. System, Ltd., Toronto, Canada, a communicating electric system.

This invention relates to a telephone system employing three common wires besides a line wire.

Means are disclosed for the operation of the system including a method for maintaining a constant potential across the common wires which constitute a three wire power circuit.

TELEPHONE SWITCH.

Addington L. Brinckle, Philadelphia, Pa., patents (No. 821,981; dated May 29, 1906; filed December 13, 1904; serial number 236,655) telephone switch.

This invention has for its object the provision of a switch for use upon portable desk stands, when the receiver carries a head band instead of being of the ordinary type.

The design recommended for such a switch is of the push button type, so located that it may be conveniently manipulated by the hand of the person wearing the receiver.

TELEPHONE SELECTING DEVICE.

William David Watkins, San Jose, California, patents (No. 821,069; dated May 22, 1906; filed May 16, 1904; serial No. 208,225) a telephone selecting device.

This invention provides for improvements in telephone selecting apparatus, resulting in a selecting and lock-out mechanism which may be placed on party lines. The inventor describes apparatus so arranged that on the calling of one subscriber on a line, all the others will be cut out, making it impossible for any subscriber along the line to listen to a conversation or break in upon a conservation when the line is in use by another person. A further object of the invention is to provide an apparatus, all the parts of which shall be interchangeable, although capable of being so adjusted that each separate selector shall have an individual arrangement corresponding to the number of the station at which it is located. The apparatus consists substantially of an electromagnet, supported on a suitable base, which also carries a toothed selector disc. Each movement of the armature of the electromagnet, which is under the control of the calling subscriber at the distant station, causes the rotation of the selector disc through the space occupied by one tooth. A circuit is described which is suitable for connecting the electromagnetic selective device, a special switch used in addition to the regular hook switch and other parts of the subscriber's set.

This circuit is so arranged that when a subscriber wishes to make a call the lifting of his telephone from the hook puts his instrument in condition for talking and signalling. The closing of the special switch a number of times equal to the call number of the desired station causes the rotation of all selector disks, and the special adjustment of these disks and associated switches causes circuits of all subscriber's sets except the one desired to be put in such a condition that talking and ringing currents cannot be received.

EXTENSION ARM TELEPHONE.

Thomas J. Skelley, Collinwood, Ohio, patents (No. 818,982; dated April 24, 1906; filed April 25, 1904; serial No. 204,735) an extension arm telephone.

This invention discloses a design for an adjustable arm comprising several members pivoted together, so that when partly extended they assume the shape of the letter N in a horizontal position. One end is adapted to fit into a bracket for attachment to a desk and the other carries a stud adapted to fit into the vertical pedestal of a desk telephone.

MULTIPLE SWITCHBOARD FOR TELEPHONE EXCHANGES.

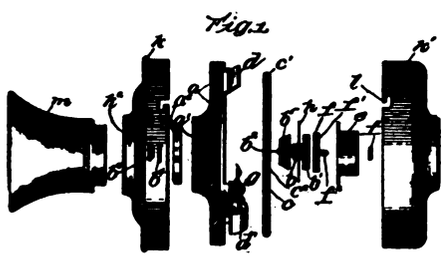
Milo G. Kellogg, Chicago, Ill., patents (No. 821,807; dated May 29, 1906; filed November 30, 1891; serial number 413,605) multiple switchboard for telephone exchanges.

This invention relates to a metallic circuit system, or a system in which part of the lines are metallic circuit lines. It consists of a system for calling, testing, switching and clearing out, employing polarized annunciators in combination with switching apparatus of a type now practically obsolete.

TRANSMITTER.

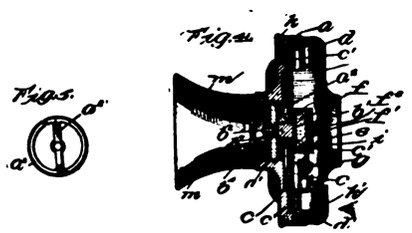
Henry F. Albright, New York, N. Y., patents (No. 830,279; dated Sept. 4, 1906; filed October 21, 1904; serial No. 229,488) and assigns to Western Electric Co., Chicago, Ill., a telephone transmitter.

The inventor describes a transmitter which he claims can be adjusted after being placed in position, thus allowing more delicate adjustment than the ordinary type. Fig 1 shows the various



parts in the order in which they are put together and Fig 4 is a section of the assembled transmitter.

The usual front plate carries the bridge piece a^2 (Fig. 5) which is threaded externally to engage the front plate. This bridge



supports the front electrode which is mounted on the pin b^2, held by the nut b^4. The rear electrode is fastened to the chamber e, which is mounted on the diaphragm. A supplementary diaphragm h closes the front of the electrode chamber. After the transmitter has been assembled and mounted it is adjusted by turning the bridge piece a^2, which is secured in its adjusted position by the lock nut b^3.

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QUERIES

GROUND IN SANDY SOIL.—(766.)

On one of our grounded country lines we are much troubled by poor ringing. We use 6 foot ground rods, but they do not seem to be good enough. The soil is very sandy. Is there any way that we can do better than by the use of the rods? R. G.

In sandy soil the reason why a ground rod gives poor results is that it does not, as a rule, reach down to permanently moist earth, and therefore there is not sufficient contact surface with conducting material to carry the current. That is to say, the greater portion of the sand acts as an insulator.

The only remedy seems to be to provide a conducting surface located at sufficient depth to make sure that the current always will have a sure path to ground. A very good way to accomplish this is to dig a hole two or three feet in diameter and carry it down far enough to reach moisture even in the driest season. If possible a little broken coke or charcoal should be scattered over the bottom of this hole, as this is a fairly good conductor and helps to retain the moisture to a considerable extent. Over this may be placed a coil of wire very loosely wound, or a large copper plate. The ground wire should be firmly soldered to this conducting bed in several places, and run to the instrument. For part of its length it should run through a pipe, which need not necessarily extend all the way down to the ground plate of coil, but should extend, however, several inches below the surface line of the earth to prevent the wire from being broken off at this point.

Such grounds are expensive to install, but they are likely to work well after once put in; and this is the main thing when an instrument is several miles from the office.

MEASURING RESISTANCE AND INSULATION WITH A VOLTMETER.—(767.)

Will you please explain how I can measure resistance and insulation of pairs in a cable with a voltmeter? Is there any way in which it can be figured simply without the use of a formula? B. A.

In measuring resistance with a voltmeter advantage is taken of the principle that when a current passes through a conductor, or series of conductors, the drop in potential thoroughout any portion of the conductor is proportional to its resistance. If the voltmeter is connected in series with a battery and conductor, forming a closed circuit, what the voltmeter reading

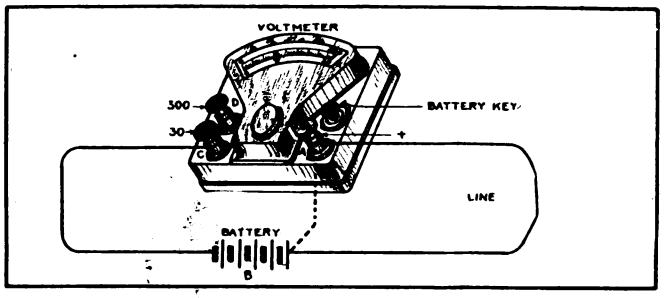

Fig. 767a.

indicates is the drop in potential through the winding of the instrument. It will be readily seen that when the voltage of the battery is known, and the drop through the instrument, of known resistance, has been obtained, it is easy to form a proportion having three known elements by means of which the unknown resistance may be worked out.

Let us assume, for example, that you wish to find out the loop resistance of a pair of conductors, and have a battery of several cells and a portable voltmeter. In the drawings Figs. 767*a* and 767*b* the instrument represented is of a common type having two scales, one graduated to read up to 30 volts and the other to 300. The positive terminal of battery is to be connected (either directly or through the line) to the post A, while the negative terminal goes to either C or D, according to the scale which is to be used.

The first step is to ascertain the voltage of the battery. This is given by the reading of the voltmeter when connected directly to the battery, the dotted line representing the connection for the positive terminal.

The instrument is then connected with the battery, line, and low

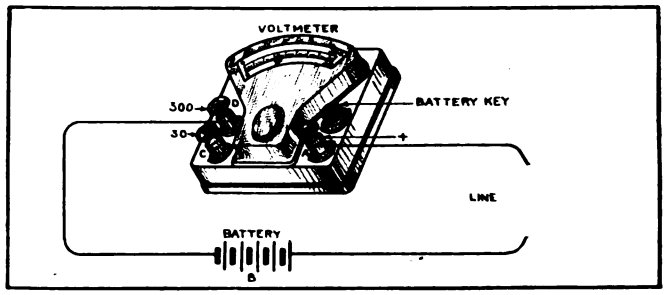

Fig. 767b.

winding of the voltmeter in series, and another reading taken. As the resistance in the voltmeter is furnished by the manufacturers you now have all the data needed.

To derive a formula let the line resistance be represented by x, the battery voltage by B and the voltmeter reading with the line in series by E, and the voltmeter resistance by r. Your readings show that there is a drop of B volts through the entire circuit, of which the resistance is $r + x$, while through the resistance r there is a drop of E volts. This gives us, according to the principle above stated, the proportion

$$B : E = r + x : r$$

from which we obtain

$$B\,r = E\,(r + x)$$

or

$$B\,r = E\,r + E\,x$$

Solving for x we have

$$x = \frac{B\,r - E\,r}{E} = \frac{r\,(B - E)}{E}$$

This is equivalent to the statement in words that the loop resistance of the wires is equal to the quotient obtained by dividing the product of the resistance of the voltmeter into the difference between the voltage of the battery and the voltmeter reading, by the voltmeter reading.

A rough approximation may be made with scarcely any figuring. For instance, if the voltmeter reading directly on the battery is 30 volts, and 20 volts with the line in series, it shows that the line resistance is half that of the voltmeter.

As measuring the insulation of two conductors comes down practically to measuring the resistance, the same method and formula applies. It is necessary, however, owing to the large figures obtained in the results, to use a high voltage battery, and the high scale of the voltmeter.

The connections proper for measuring insulation are shown in Fig. 767*b*. If the line were closed at the distant end the figures obtained would give its loop resistance instead of insulation resistance.

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

THE NEW BAIRD PAY STATION.

THE Baird Manufacturing Co., 1503 Briar Place, Chicago, Ill., has for eighteen months been at work on a new model pay station, invented by its president, E. P. Baird, in which it claims to have overcome many faults in previous types and also to have introduced a number of important new features. The machine is a sheet steel production throughout, and as all parts are made from dies and tools they are interchangeable. The mechanism is all mounted in a framework easily removed without disturbing the case. Some of the special features of the machine to which the company invites attention are as follows:

Noiseless mechanism during signal period; coins on a string cannot be used to make repeated calls, nor can signals be struck by wires, etc.; a muffler on the gong prevents getting a signal by striking the case; coins deposited in the wrong slot by mistake are returned; but one coin at a time can be deposited, thus preventing confusion of an operator by making several deposits in rapid succession; separate locks are used on mechanism and cash compartments; the sheet steel cash box has a reinforced door and combination lock which together give maximum security.

A cash register attachment can be supplied to record the deposit of each coin by the movement of hands over the faces of dials presenting an appearance similar to the dial plate of a gas or electric meter. While the company is prepared to supply this new pay station with any desired signals, it strongly recommends the new "Common Sense" code as far superior to any other because it is unmistakable to the operator and unbeatable by the patron. For 5 cents the signal is one stroke; for 10 cents two strokes, and for 25 cents three strokes, all on a loud cathedral gong, which is muffled at all times excepting when a coin is deposited.

The machine represented in Fig. 2 is fitted up as a portable set for use on show cases in stores, in restaurants, hospitals, etc. The entire weight, including telephone, is but ten pounds. Other styles of mountings are shown in the Baird Company's bulletin No. 51, which can be obtained on request.

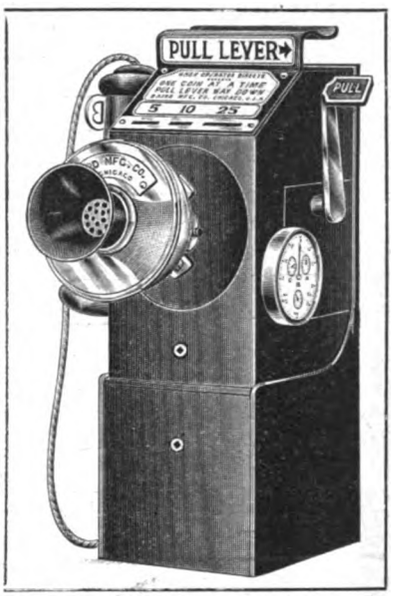

Fig. 2. Portable sheet steel Baird pay station, with cash register attachment.

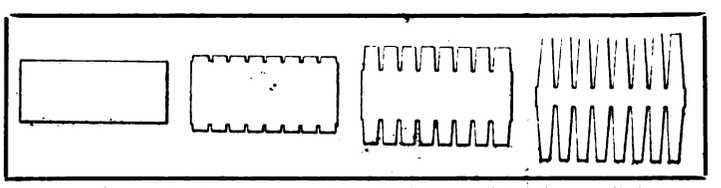

Fig. 1. Stages in the progress of Gould battery plates from rolled lead blank to completed form; compare length of boundary line in figures at opposite ends.

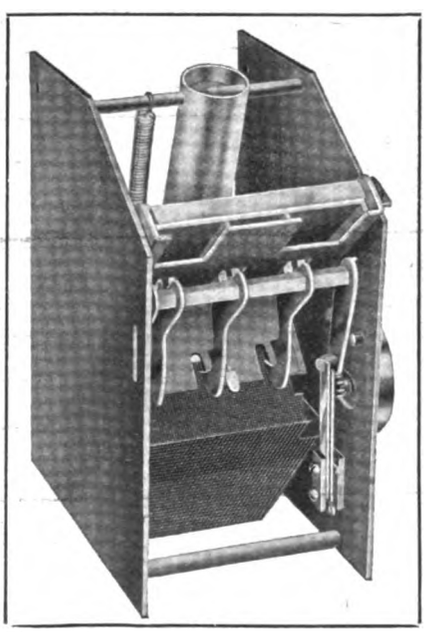

Fig. 1. Front view of the mechanism of the new Baird Pay Station.

JULIUS ANDRAE & SONS CO., 99 W. Water street, Milwaukee, Wis., is manufacturing several specially designed telephone parts which deserve careful attention. One of these features in which are overcome many difficulties which formerly were found in apparatus of this class is a switch hook which can be easily removed without disturbing the contact springs or altering the adjustment in any way.

Another specialty which this company manufactures is a U-shaped ringer, which is said to be adjusted very easily with no other tools than a screw driver.

THE FRANKEL DISPLAY FIXTURE COMPANY, 740-742 Broadway, New York, has prepared a blotter which presents a few points showing how the use of the Frankel Electric Testing Clip facilitates rapid trouble hunting, etc. The company will send this blotter or any further information upon receipt of a request.

SPUN PLATES FOR STORAGE BATTERIES.

LONG life and low maintenance expense, together with the ability to retain the full initial capacity throughout its life, are the most essential things to be secured in a storage battery. With these objects in view the Gould Storage Battery Company, No. 1 West 34th street, New York, has developed and applied to the construction of its plates some very interesting processes. The plates in their original form are simply sheet lead blanks. In order to give a very large contact surface for active material the company uses a spinning process, which develops the surface of a plate into a succession of small ridges and channels of a special form without the removal or addition of other metal and enormously increases the contact area which is exposed to the electrolyte.

To secure this result the blanks are placed in steel frames, which move back and forth between two shafts on which are mounted steel discs set close together, with spacing washers between them. A uniform pressure is maintained between the rolls and the face of the sheet lead and as the lead is moved the discs are rotated rapidly.

It will be seen that the effect of this is to not merely create channels in the surface of the lead, but to cause the displaced material to rise up into ridges, and to compress the lead which has been moved in such a way as to give it the maximum density and homogeneous structure.

In Fig. 1 are shown four diagrams illustrating the plates at different stages in this spinning process. At the left is a section of the original blank with plane surfaces. After it has been passed through the rolls a few times the form is somewhat modified, the condition being advanced to the stage shown in the adjacent figure. Gradually the discs are forced nearer and nearer to the center of the metal, and as they advance the dis-

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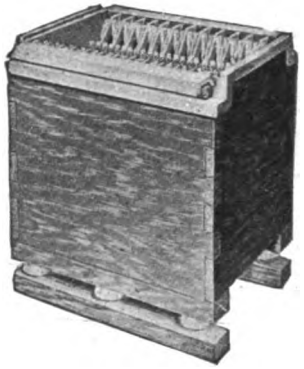


Complete element of Gould battery, telephone type, set up in wooden tank.

placed material rises between them until there is a succession of high ridges and deep grooves, as shown in the figure at the extreme right. The shape of the plate is shown more clearly in Fig. 2, which illustrates the point claimed by the company that the shape and structure of the plate is such as to secure all necessary mechanical strength, while the uniformity of the surfaces presented for a given face area on all parts of the plate secures a regularly distributed action, which also has a very important bearing in preventing danger of buckling when in service.

In order to secure the necessary mechanical strength and to provide for taking current uniformly from all portions of the surface, plates of different sizes are divided into varying numbers of sections. In the spinning process the disc enters at each end of a section and is removed at the other end; in this way leaving between the sections an unspun portion, which firmly anchors each rib, and carries the current from it to the main support which is fastened to the bus bar.

Fig. 3. Section showng shape of unspun portion between ribs of Gould plate.

The appearance of the sections shown in Figs. 3 and 4 seems to indicate that these solid portions are sufficiently large to properly take care of both the electrical and mechanical requirements of the plates.

A further idea of the structure of a single plate may be gathered from Fig. 5, which indicates not only the structure of the ribs and channels, but also of the central portions of the plate which remain untouched in the spinning process, and serve to equalize the action and take off the current which is generated.

This spinning process is, of course, only preliminary to the preparation of the active material, and is carried on with the intention of providing a large surface of suitable form. To provide the active material peroxide of lead is formed electro-chemically out of the actual material of the ribs composing the contact surface. The grooves become filled with this material in a closely packed and highly porous condition. The company states that experience has shown that the grooves thus filled retain the active material indefinitely, as the contact is so intimate that the possibility of its falling out is reduced to the minimum. It is for this reason that this plate retains not only its initial structure but its initial capacity up to the limit of its life.

View of Gould plate showing sectional arrangement and unique form of support.

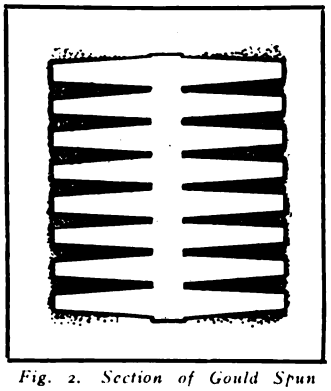


Fig. 2. Section of Gould Spun Plate.

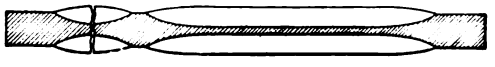
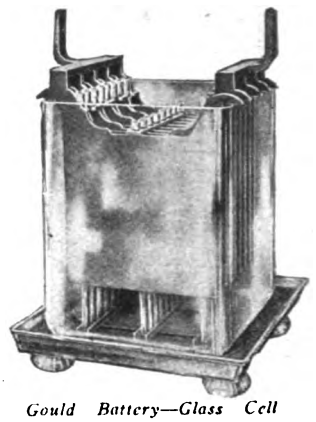


Fig. 4. Broken section of Gould plate, showing solid portion.

A NEW LOCKOUT SYSTEM.

THE "Poole" Lockout System depends for its operation on a condition which is present in every central energy line, viz., the electromotive force between the sides of the line when a station is bridged across is less than when the line is clear. For instance, in a 40-volt system, a voltmeter will read 40 volts (less the drop in voltage to the point where the test is made) where there are no parties across the line, but as soon as one party lifts the receiver at that station, the reading will fall to about 6 volts. It is this difference which is utilized in the "Poole Lockout System." All the stations are normally locked out and are cut in the line by a relay. If there is no other party across the line, this relay will pull up when the receiver is lifted and put that station in operation. As before stated, this cutting the station in on the line will so lower the E. M. F. between the sides of the line that there will not be enough voltage to pull up any other relay on the line, consequently all other subscribers' stations are locked out.



Gould Battery—Glass Cell Mounting.

To carry this principle into effect a relay is provided at each station. This relay has two windings, one of 1,000 ohms and one of 30 ohms. The circuit of the relay and telephone set is shown in Fig. 1. Referring to this will show that until the relay is pulled up the receiver and transmitter circuit are both open, thus making them inoperative. When the receiver is taken from the hook current flows first through the high resistance winding. If there is no other station across the line, this current will pull up the relay armature and close the transmitter and receiver circuit at the relay contacts. It will be noticed that the low winding is in series with the transmitter. This holds the armature of the relay firmly to its place, permitting the use of heavy German silver contact springs.

With the armature pulled up the current has two paths, one through the 1,000 ohm winding, and one through the transmitter and 30 ohm winding. Obviously, a greater amount of current will pass through the low winding than through the high winding, and a still greater amount of current will pass through both windings. The difference of potential across the line drops to about 6 volts. Should a second station on the line have the receiver removed from the hook, closing a circuit through its 1,000 ohm winding, the amount of current required (about 10 volts) to pull up the armature of the relay at this second station would not be available, on account

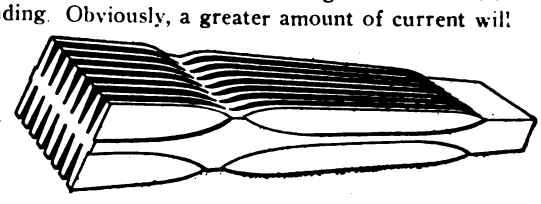


Fig. 5. Perspective view of a portion of Gould plate.

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When the American Public are telephoning they don't want to be required to do manual labor, such as pulling levers. With Gray Stations you simply drop in the coins.

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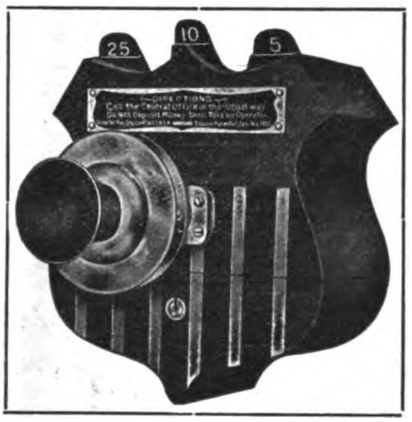

FOR SALE

For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE—10 **SECTIONS** American Electric Company **CENTRAL CALL SWITCHBOARDS**, 105 drops each. **ONE** 1,000 line American Electric **DISTRIBUTING RACK. ONE** 400 line American Electric **DISTRIBUTING RACK.** 14 one hundred line **BURNS TERMINALS**, American Electric. 120 **PAIRS** Kellogg **SUPERVISORY CORD RELAYS.** All in good condition and at a bargain. Portsmouth Telephone Co., Portsmouth, Ohio. 675

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

DRAUGHTSMEN—Mechanical, electrical, structural, architectural—are at a premium. In a recent issue of "Opportunities," our monthly publication, we listed 104 positions for draughtsmen at salaries of $900-$2,500. Sample copy of "Opportunities" is free for the asking. Hapgoods, 305 Broadway, New York. 464

WANTED—Manager, one who understands common battery plants, is familiar with "operation," and knows the business side of exchange management. Address, stating age, experience and salary required, Box 674, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 674

WANTED—City Foreman competent to superintend outside construction and locate and repair cable faults. Plant 2,500 subscribers. State experience, reference and salary. Address Box 668, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 668

DRAUGHTSMEN wanted who are able to lay out plans for the interior cabling of large exchanges. Men who have done installing preferred. Address Box 672, care The American Telephone Journal, 100 William street, New York. 672

WANTED---Contiuned

WANTED—Position as trouble-man or manager of small exchange. Understand both magneto and common battery systems. At present employed as manager of a Bell plant, but wish to change to Independent field. Best of references. Married. Address Box 671, care The American Telephone Journal, 100 William street, New York. 671

WANTED—Successful telephone contract agent desires position with progressive Independent telephone company. Correspondence desired with companies who contemplate raising or adjusting rates, selling coupons. Local and toll business developed, results guaranteed. Address box 670, care The American Telephone Journal, 100 William street, New York. 670

WANTED—Position as manager or chief inspector by practical telephone man with seven years' experience. Independent company operating in Maryland, Virginia, or West Virginia. Address Box 673, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 673

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"FORGED STEEL"

Messenger Hanger

A STRONG, SERVICEABLE HANGER MADE IN THREE WEIGHTS. GALVANIZED OR JAPANNED

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CASH REGISTERS ON PAY-STATIONS ARE INVALUABLE

¶ They safeguard the integrity of the collector and insure to the telephone company its rightful dues. At $1.00 additional cost they are certainly indispensable.

Write for Bulletin No. 51, Describing Our New Sheet Steel, Up-to-date Machine

BAIRD MANUFACTURING COMPANY, 1506 Briar Place, CHICAGO

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of the consumption of current by the low resistance path through the 1,000 and 30 ohm windings in parallel at the first station.

The receiver and condenser in series are in shunt around this 30 ohm coil, but, owing to the high impedance of this coil to voice currents they go through the former path. The induction coil is thereby rendered unnecessary.

A small arrow attached to the relay armature is brought into view through a mica covered opening in the cover of the device when the relay armature is operated.

For the rare case of a station wanting another on the same line the button is provided in the low resistance path as will be seen in Fig. 1. When one party calls for another on the same line, central instructs the calling party to press his button until he hears the called party answer. Pressing the button opens the low resistance path and the relay armature will then be held up by current through the 1,000 ohm winding which is bridged across the line. When the called party removes his receiver from the hook a second 1,000 ohm resistance is bridged across the line. The resistance at both stations will be equal, consequently the second station relay will operate, as it should.

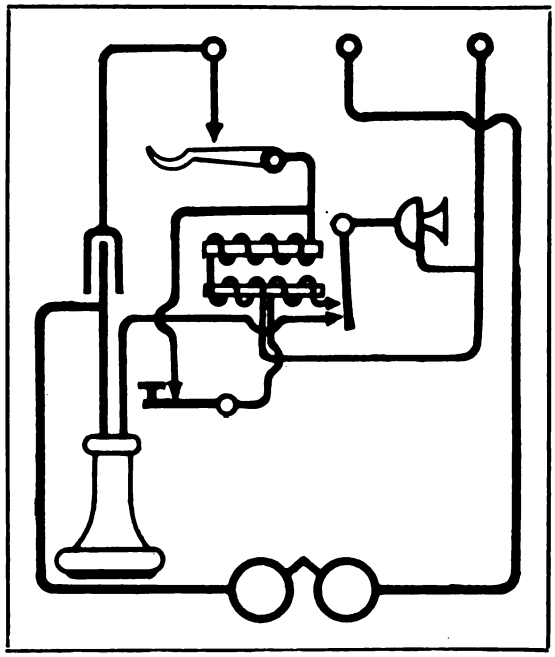

Fig. 1. Circuit of Poole Lock-Out Sytsem.

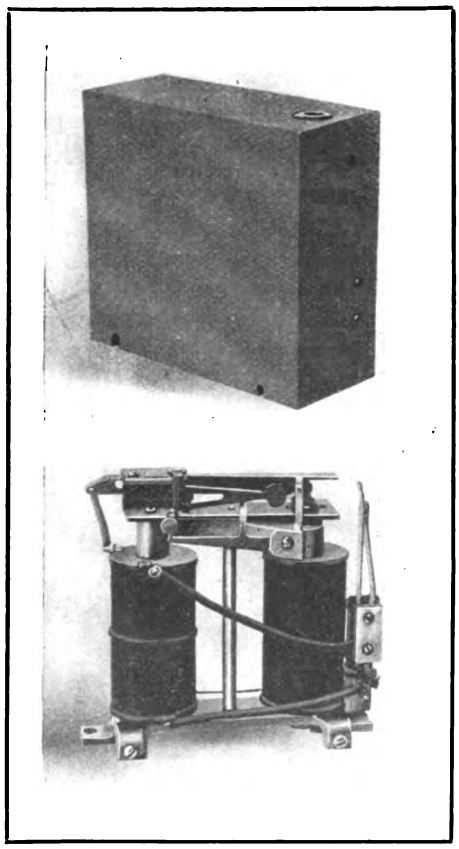

Fig. 2. Relay used in the Poole Lockout System, with cover removed.

The points of superiority the manufacturers claim for this device are its simplicity of mechanical construction and positive action made possible by the use of two coils. Better transmission is said to be obtained by eliminating the induction coil. Important features of the relay are its permanent adjustment and ability to operate on a wide margin.

THE CHICAGO WRITING MACHINE CO., manufacturer of the Adjustaphone, has recently announced the removal of its offices from Galesburg, Ill., to 35 Randolph street, Chicago. It will be pleased to answer inquiries concerning its apparatus which are mailed to the new address.

THE CENTRAL TELEPHONE AND ELECTRIC COMPANY, St. Louis, Mo., has adopted a unique catalogue system and is just distributing the first two bulletins, Nos. 29 and 30, to the regular telephone trade on request. These bulletins, instead of having a general catalogue and a supplemental net price list, necessitating the reference to both places for price on one article, give net prices on all construction materials as well as telephone apparatus. The books are illustrated throughout and are very attractive in make-up.

The Central Telephone and Electric Company reports an enormous increase in its sales as the result of a very aggressive campaign for business. Its summer season has shown no let-up in orders, actual shipments being far in advance of those of last year.

FRANK B. COOK, 238 West Lake street, Chicago, Ill., has received a great number of orders for his protective apparatus of various sorts. Mr. Cook says that the largest part of his business is in switchboard, pole cable terminals and subscribers' station protectors. A few of the orders he has recently received for these various types are as follows:

Distributing frame and protectors for Granite City, Ill.; Kirkwood, Mo.; Clayton, Mo.; Lexington, Neb.; Schoolcraft, Mich.; Boise City, Idaho; Seattle, Wash.; Seneca Falls, N. Y.; Delphi, Ind.; Akron, Ohio.

THE EDWARDS-HINE COMPANY, 5 and 7 Pearl street, Grand Rapids, Mich., has recently issued a folder showing in an attractive way the various styles of "Shield" labels which it is distributing. These are gummed, and may be used in a great variety of locations. A special thirty day price offer is made for those who send cash with orders. The company will be pleased to send out these folders to interested persons.

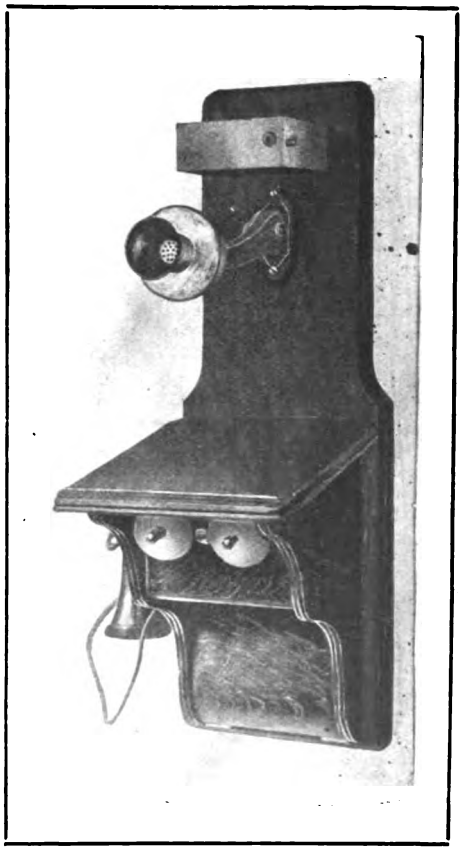

Fig. 3. Central Energy Wall Set, with Poole Lockout Device attached.

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NEW PRODUCTS *from*

THE PIONEER INDEPENDENT TELEPHONE FACTORY

300 LINE 3 POSITION WESTERN SWITCHBOARD.

WESTERN LIGHTNING ARRESTER CABINET.

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58 West Jackson Boulevard CHICAGO Established 1893

Are You Building for the Present or the Future?

This is a vital question. Perhaps you haven't given as much thought to it as you should.

Poles on the average do not last more than eight years. The available supply is rapidly diminishing, hence when the time arrives for reconstruction the cost will be considerably more than it is at present.

The question then is, **"Can the life of poles be extended?"**

The answer is, **"Yes, by using Avenarius Carbolineum."**

This liquid preparation will double the life of poles to which it is applied and at the same time strengthens the fibre of the timber.

Write for book of proof and ask for prices. You will be surprised.

Cheap as Paint. Good as Gold

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is promoted if the operator is relieved of all unnecessary strain and worry.

Use the CALCULAGRAPH.

To time a toll message it is only necessary to insert a ticket with one hand, to move the lever once at the beginning and again at the end of the connection and then to remove the card.

Result: An exact printed record of the elapsed time and the time of day, dated and ready to file. Install one.

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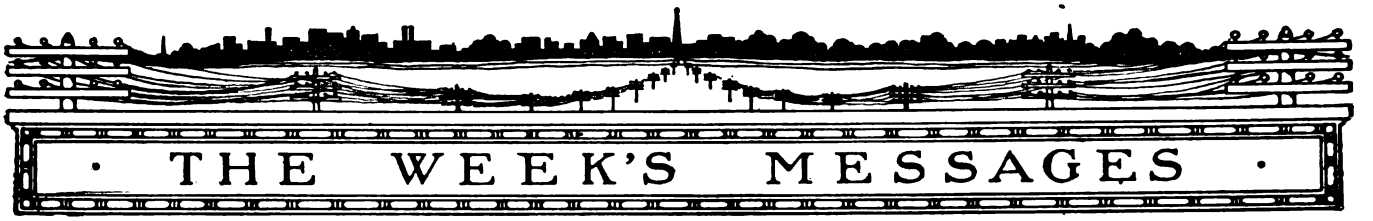

NEW COMPANIES.

BREESE, ILL.—An Independent telephone company, to be known as the People's Telephone Company, has been incorporated to operate telephone and telegraph lines at Breese, Clinton County, Ill. Its capital stock is fixed at $15,000, and the following are among the incorporators: Benjamin H. Donne, B. J. Lagen and W. G. Brechteld.

NATCHEZ, MISS.—There is a movement on foot to organize a new Independent telephone company to operate in opposition to the Cumberland. A fifteen-year franchise has been asked for, and the petitioners promise the city 5 per cent. of the gross receipts. This action has been brought about owing to the poor service rendered by the Cumberland company.

DENBIGH, N. D.—An Independent telephone company has been organized by the business men of Denbigh.

YORK, N. D.—The York Telephone Company has been organized and incorporated, and will establish an exchange at York. The following officers and directors have been elected: President, W. W. Wirtz; secretary, S. E. Arthur; treasurer, A. L. Obert. Directors: A. D. Cochrane, who is also manager of the company; John Gullickson and J. T. Sable.

AKRON, OHIO.—The Independent Telephone Building Company, of Akron, Ohio, has been incorporated with a capital stock of $35,000. The incorporators are Charles H. Lahr, Charles Currie, R. E. Inskeep, G. McAlonan and F. H. Stuart.

MARSHFIELD, OREGON.—A new telephone company has been organized in Marshfield. Prominent Marshfield citizens are back of the enterprise, and it is their intention to construct a line from Marshfield to Gardiner, through the Tenmile country.

BELFAST, PA.—At a meeting recently held at Belfast, Pa., the Northampton County Pomona Grange organized an Independent telephone company, to be known as the Patrons Rural Telephone Company, and chose the following directors: D. M. Weber, Hellertown; M. O. Reagle, Mount Bethel; Albert De Pugh, Martin's Creek; A. F. Renner, Nazareth; Herbert Shock, Wind Gap. It is the intention of the company to construct a number of rural lines in various parts of the country.

GAINES, PA.—Articles of incorporation have been filed by the Elk Run Telephone Association, of Gaines, Tioga County. The company is capitalized at $5,000, and it is its intention to construct and maintain lines throughout Potter and Tioga Counties.

FALFURRIAS, TEX.—The Falfurrias Telephone Company, of Falfurrias, Tex., has been incorporated with a capital stock of $5,000. The incorporators of the new company are: Frank S. Rachal, John S. Donahoe, B. Temple Henry, Richard C. Miller and D. H. Dashiell.

WEIR, TEX.—Articles of incorporation have been filed by the Welber-Weir Telephone Company, of Weir, Williamson County. The company will commence business with a capital stock of $2,000. Among the incorporators are Frank Doering, A. M. Nalley, J. W. Long and others.

LOYAL, WIS.—An Independent telephone company to operate in Loyal, Clark County, Wis., has been incorporated. The capital stock is placed at $1,500, and the incorporators are C. M. Taylor, Morris M. Weaver and H. Haslett.

LANGFORD, MANITOBA, CAN.—Notice has been given that Letters Patent have been issued incorporating William C. Pollock, James C. Drysdale, Robert Hunter, Walter Dryden, James Dark, Duncan McLaren and John McLaren, all of Langford, Manitoba, as the Union Farmers' Telephone Company, for constructing, owning and operating a telephone system. The capital stock is fixed at $20,000.

FRANCHISES.

DENVER, COLO.—Application for submitting to voters at the fall election the question of granting to a new telephone company a franchise at Denver, Colo., has been made by Ulysses S. Grant, Jr., son of former General U. S. Grant, representing California capitalists. Provision for the cost of election has been made by depositing $10,000 with the county treasurer, and $4,500 with the city treasurer. The company agrees that no rental shall be charged until 5,000 telephones are in operation. The city is offered 1 per cent. of the gross receipts during the twenty years the franchise is in operation, and is given the right to purchase the plant at the end of the term, price to be fixed by arbitration. The estimated cost of the proposed new plant is placed at $1,000,000, of which $250,000 is to be expended in 1907, an additional $250,000 in 1908 and $500,000 in 1909.

VALLEY CITY, N. D.—The C. O. Wheeler Telephone Company has applied to the city council of Valley City, N. D., for a perpetual franchise, without any maximum charge for telephones.

HOPE VALLEY, R. I.—The Home Telephone Company, of Providence, R. I., has made application for a franchise to construct a telephone system at Hope Valley, R. I.

HOPKINTON, R. I.—The Home Telephone Company, of Providence, R. I., which has already secured franchises in a number of cities in the State of Rhode Island, has applied for a franchise at Hopkinton. If the franchise is granted the company guarantees to give good service at a substantial reduction in price.

MELITA, ONT., CAN.—The Melita-Arthur Telephone Company has been granted permission to erect a section of its system in Berenda. Both Waskada and Napinka will likely have telephone connections this fall.

FINANCIAL.

CLARINGTON, O.—The capital stock of the Home Telephone Company, Clarington, Ohio, has been increased from $5,000 to $30,000.

COMBINATIONS.

CONRAD, IA.—The Independent Telephone Exchange at Conrad, Ia., has been purchased by Guy Fitzgerald, who formerly operated the exchange at Union.

ST. LOUIS, MO.—The Kinloch Telephone Company, of St. Louis, has acquired the Wabash Valley Telephone Company, with exchanges at Paris, Marshall and Chrisman, Ill., and farmers' lines with a total of 5,000 telephones.

MOUNT HOLLY, N. J.—The property of the Inter-State Telephone Company has been formally transferred to the reorganizers of the concern, and better service to the public is promised on all the lines. The contemplated improvements will nearly all be made in the northern part of New Jersey.

ELECTIONS.

HILLSBORO, ILL.—The following directors have been elected by the People's Mutual Telephone Company of Hillsboro: Rufus Cruthis, of Sorento; A. K. Vandever, of Irving; M. L. Moyer, of Hillsboro.

COLUMBIA CITY, IND.—The Whitley County Farmers' Mutual Telephone Company has elected the following officers and directors: President, Albert Bush; vice-president, Melvin Blain; second vice-president, Charles W. Alexander; secretary, William H. Carter; treasurer, Charles R. Banks. Directors: Albert Bush, Cleveland township; Charles Banks, Cleveland township; Everett E. Rindfuz, Richland township; Jesse Miller, Etna township; Sherman Hively, Thorncreek township; Charles W. Alexander, Washington township; Lewis Plummer, Jefferson township; William H. Carter and Melvin Blain, Columbia township.

PERSONAL.

J. L. BIRSTON has been made manager by the Topeka and El Reno Telephone Company.

GEO. COLE has been appointed manager of the Bell Telephone Company at Cedar Falls, Ia. He was formerly with the Bell Company at Marshalltown.

J. N. COX has been appointed superintendent of the Nashville division of the Cumberland Telephone and Telegraph Company at Nashville, Tenn.

GEORGE DODDS has been elected district manager by the Northwestern Telephone Company. His district includes the Southeastern part of Mis-

NEWS WANTED

THE matter contained upon the Message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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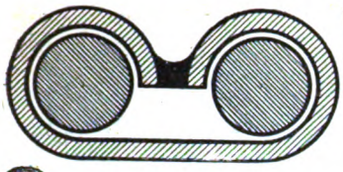

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BEFORE TWISTING

Perfect Contact

Means more than increased conductivity—it means longer life to the joint because corrosion can't take place.

COOK'S SELF-WELDING WIRE JOINT

makes a permanently perfect joint every time. Free Sample to show you.

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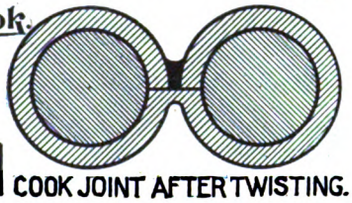
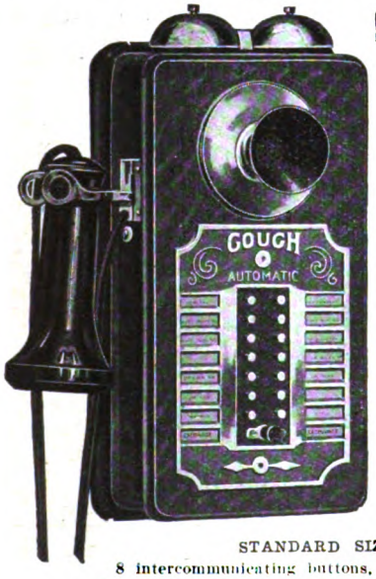


COOK JOINT AFTER TWISTING.

No Operator--



50 Private Telephones Connected to the City Exchange. The little trunk button at the bottom of the plate does it. Any number of intercommunicating telephones may be thus equipped. Only two extra wires for the entire number.

Trunk Button

Send for Catalogues

STANDARD SIZES:

8	intercommunicating	buttons,	1	exchange	button
14	"	"	1	"	"
18	"	"	1	"	"
24	"	"	1	"	"
28	"	"	1	"	"

100% CHEAPER THAN BRANCH EXCHANGE.
100% QUICKER; 100% MORE SATISFACTORY.

S. H. COUCH CO., Inc., Manufacturers

162 PEARL STREET, BOSTON, MASS.

MICHIGAN WHITE CEDAR POLES

In addition to the several yards we have had in the past, we wish to call your attention to our new yard which is located at Escanaba, Mich.

The acquisition of this new yard enables us to ship poles by all railroads or by the lake routes, thereby enabling us to give the best delivered prices.

The location of our new yard makes it easier to secure cars, thus facilitating prompt shipment.

In many cases poles can be shipped by car-ferry, making possible a great saving in cases of shipment to Eastern points.

We are wholesalers exclusively, shipping in car lots only.

Write us for delivered prices and "Pole Booklet No. 3-A." Yours for the asking."

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THE WEEK'S MESSAGES

sissippi embracing a number of counties along the Mississippi River south of Red Wing.

FREDERICK FRASER has severed his connection with the Home Telephone Company, Kansas City, Mo., to accept a position with the Mobile Home Telephone Company, Mobile, Ala. He will superintend the installation of their extensive underground cable system.

H. C. JONES has been made manager of the exchange at Mayesville, Ky. He has recently been superintending the installation of an exchange at Gadsden, Ala.

MELVIN W. KOONS has been appointed manager of the Mankato Citizens' Telephone Company with headquarters at Mankato, Minn. He has been with the Tri-State Telephone Company at Minneapolis.

DANIEL MOGEE has been made manager of the exchange at Aspen, Col. by the Colorado Telephone Company.

N. D. PENNY has been made manager of the Central Union Telephone Company exchange at Tiffin, Ohio.

L. D. RICHARDSON, formerly general superintendent of the Tri-State Telephone and Telegraph Company, at St. Paul, Minn., has recently taken charge of the new North Dakota Independent Telephone Company, with the title of general manager. His headquarters will be at Fargo, N. D.

MISCELLANEOUS.

CLOUDCROFT, N. M.—Cloudcroft is soon to have telephone communication with outside points. Messrs. Cleve and Cadenhead, of Elk, are interested in the construction of a proposed line which is to be built from Artesia to Cloudcroft. The necessary amount, $2,500, to build the line has been secured, and a call for contracts will be issued at once. The line will be built by way of Elk and Mayhill, and connect with the Alamogordo line.

New Construction in the Field

MOBILE, ALA.—The Long Distance Telephone and Telegraph Company, which is to operate telephone exchanges in Alabama, Tennessee and Kentucky, will construct a line between Mobile and New Orleans.

PLEASANT PLAINS, ARK.—A line is being constructed by the Pleasant Plains Telephone Company to Oil Trough to connect with the local company at that point.

LOS ANGELES, CAL.—The Home Telephone Company is to establish another exchange in Los Angeles. It is estimated that the cost of the new exchange will be between $30,000 and $40,000.

BOLTON, CONN.—The directors of the Bolton and Coventry Telephone Association are considering the advisability of extending the company's lines.

CHICAGO, ILL.—The Lake Shore Railroad is stringing a second long distance telephone wire from Chicago to New York. It is thought that eventually the telephone will take the place of the telegraph in the transmission of train orders.

MARSEILLES, ILL.—A new switchboard has been installed by the Marseilles Telephone Company.

QUINCY, ILL.—After a consideration of offers submitted respectively by the Bell Telephone Company and the Independent Home Telephone Company, the Board of Education of Quincy, Ill., has decided in favor of the Independent company, and the latter's system will be installed in the city's schools.

COLUMBIA CITY, IND.—The Whitley County Farmers' Mutual Telephone Company contemplates the expenditure of $5,000 in improvements and extensions to its system.

GOSHEN, IND.—The rural lines of the Home Telephone Company of Goshen, Ind., are to undergo a thorough overhauling. In addition the company is to lay 4,000 feet of new cable, and otherwise improve its plant.

INDIANAPOLIS, IND.—The New Long Distance Telephone Company is constructing a new line connecting Logansport and South Bend, as well as Wabash, Huntington and Fort Wayne, Anderson and Muncie, Tipton and Kokomo.

BRIGHTON, ME.—The Maine Telephone Company is to materially improve its system at Brighton, and contemplates the establishment of an exchange at that point.

MERIDIAN, MISS.—The Meridian Home Telephone Company has recently completed many improvements and extensions to its plant. Chief among these was the construction of a line to York, Ala., the purpose of which was to make connection with the Long Distance Telephone & Telegraph Company, the construction of whose lines is in progress from Birmingham.

MARSHALL, MO.—The Citizens' Telephone Company expects to build a new exchange in Marshall.

SPRINGFIELD, MO.—The Springfield Home Telephone Company is installing an automatic exchange and extending its system.

SOUTH OMAHA, NEB.—The Sarpy Mutual Telephone Company, recently organized, expects soon to commence the construction of its system.

WYMORE, NEB.—A new line is being constructed by the Home Telephone Company at Wymore, Neb.

INTERVALE, N. H.—Lines are being constructed by the Baker's River Telephone Company at Lower Intervale.

MILFORD, N. J.—The Delaware Valley Telephone Company has commenced the erection of a telephone line from Milford to Riegelsville.

ELIDA, N. M.—The Roosevelt County Telephone Company is constructing a line from Elida to Texico. It is the intention of the company to build a line from Texico to Albuquerque, thereby establishing connections from the Pecos Valley with Denver, Santa Fe, Las Vegas and Albuquerque.

ITHACA, N. Y.—It is the intention of the Ithaca Telephone Company to string 20,000 feet of aerial cable. In addition it expects to lay 12,000 feet of underground cable. The company's improvements are not confined to external work; four positions have been added to the present six position board, increasing the capacity to about 4,000 telephones, and everything possible will be done to make the system thoroughly up-to-date.

WATERVILLE, N. Y.—Many extensions and improvements are being made in the system of the Waterville Telephone Company.

BALFOUR, N. D.—The Rural Telephone Company is building a line north of the city.

MINOT, N. D.—It is reported that the Tri-State Telephone Company will construct an exchange at Minot which will connect with the farmers' lines in that part of the state. A new building will be constructed.

NORWICH, N. D.—The Norwich Telephone Company, Norwich, N. D., which has recently constructed a line to Granville, contemplates the erection of a line to Deering.

BEACH CITY, O.—The Beach City Home Telephone Company, recently organized, is soon to commence the construction of its system.

GLENDALE, O.—The Glendale Telephone Exchange will install a new switchboard to take care of its increased business.

LAFAYETTE, OHIO.—The Citizens' Telephone Company of Lafayette is rebuilding its line between Lafayette and Fresno.

ECHO, ORE.—The Butter Creek Telephone Company has completed the wiring of the Umatilla reclamation project and instruments will be connected wherever construction camps are established along the line of the canals.

LOCKHART, TEX.—Arrangements are being made by the Lockhart Telephone Company to connect Burdette Wells, Tex., with all long distance points.

MEXIA, TEX.—The Waterworks Company of Mexia is building a telephone line from its office in Mexia to Springfield pumping station. Pipe is being used for telephone poles.

PORT ARTHUR, TEXAS.—The Port Arthur exchange of the South Texas Telephone Company is to be enlarged and the system extended.

KIONA, WASHINGTON.—It is the intention of the Farmers' Telephone Company to construct lines to the Rattlesnake wheat country and to Horse Heaven.

SPOKANE, WASH.—The Home Telephone Company will build a local exchange in this city.

VANCOUVER, WASH.—The Ridgefield, Sara and Vancouver Farmers' Union Telephone Company, which has recently completed a trunk line eighteen miles long, extending from Vancouver to Ridgefield, Felida and Sara, is planning to extend its lines to Pioneer and La Center.

WHEELING, WEST VA.—The National Telephone Company contemplates the construction of a line from Wheeling to Mannington and Fairmount, the right of way having been secured as far as Cameron. The cost of the new line will be in the neighborhood of $40,000, and when it is completed it will afford direct communication with Morgantown, Clarksburg, Grafton and all connecting points, and will leave only 12 miles remaining to complete the line to Parkersburg and Marietta. The company has also entered into a contract with the United States Telephone Company for the construction of a line from Wheeling to Cambridge, O., giving direct connections with Columbus, Indianapolis, Toledo and all connecting points. In addition to its outside work the company expects to string over 100,000 feet of new cable in Wheeling and vicinity to replace old cable.

CARTER, WIS.—A telephone line is being constructed from Carter to Wabeno and Laona Stone Lake by Messrs. Johnson and Hemmingway, of Carter.

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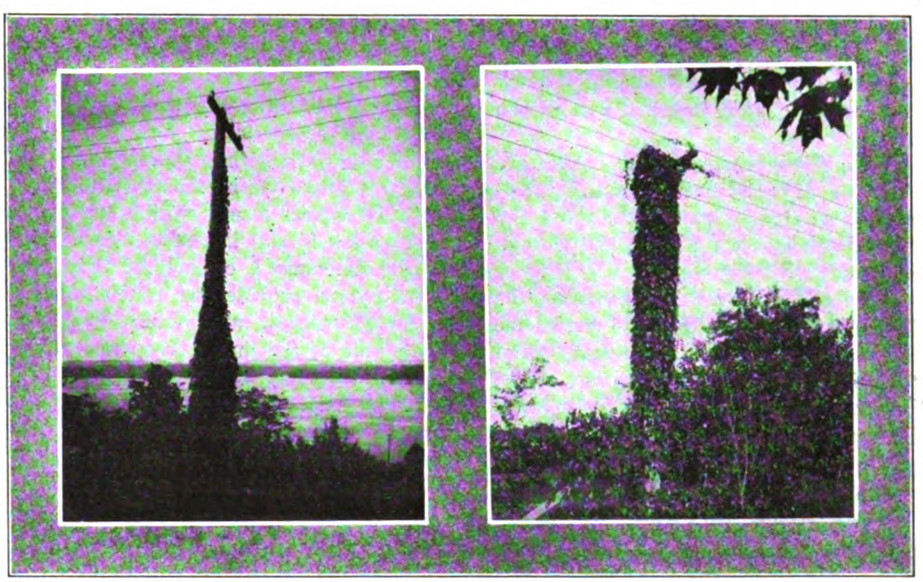
Some Northwestern Toll Lines

By B. A. Robbins.

In the strife for business there are a good many things that help toward getting a proper share. In the telephone business nothing is more essential than the giving of good service, and when it is a question of increasing the use of toll lines among subscribers the service is the whole thing. Here the subscriber has any defects which may exist in the company's plant or methods of operation impressed upon his attention more quickly and more forcibly than in any other part of his relations with the telephone company, or his use of its lines. The use of toll lines is sufficiently expensive to make it common among telephone subscribers to consider the necessity of sending a message before giving the call to the operator. Such messages are usually sent either on matters of business, or relate to things having a bearing on personal matters which give them a standing more important even than that which should be accorded to the minor business transactions. In either event if the telephone company offers facilities for carrying on the conversation with the remote party it is absolutely necessary for the continuation of its own success that these facilities should be as near perfect as is possible in the present state of knowledge of the subject of transmission. Nowadays the public is becoming educated to know what good service really is, and any falling away from the standards set are recognized and condemned. When these faults are found to exist in the toll service, which for the reasons just pointed out, is of the greatest importance to the subscriber, they are strongly impressed upon his memory, owing to the fact that they either cause him a money loss or subject him to serious personal inconvenience.



Remarkable Vine Growth Observed on Telephone Poles of the Northwestern Telephone Exchange Company Near the Banks of the Mississippi River, in Minnesota.

A single complaint on this score is likely to cause the company a considerable loss of business when it is meeting active competition. Instances where troublesome law suits have been brought owing to failure of the company to exercise due care in maintaining the facilities offered are not wanting. Moreover, any condition which impedes the service continually, and in the same manner, for any great length of time is sure to become recognized by all the telephone users of a community, who will at once throw their business to a competing company, causing a loss which is not only large, but extremely difficult to trace. It is for these reasons that the efficient maintenance of toll lines is, from a business standpoint, one of the most essential and vital necessities, demanding the most diligent attention of subordinates, and the most careful supervision of the superior officers of the company.

In view of these facts the conditions shown to exist by the photographs on this page show a lack of consideration of the necessities for communication which should not for an instance be tolerated. The poles so beautifully garlanded with vines form a part of the system of the Northwestern Telephone Exchange Company in Minnesota. The lines are advertised as affording a means of communication to thousands of Bell subscribers, located anywhere from Maine to Georgia. From a practical standpoint, however, the impossibility of obtaining good transmission even for a distance of twenty miles will be evident even to the least experienced lineman. Even in dry weather such a growth as this will produce a shunt and ground on the lines which cannot fail to have an undoubted effect upon all signalling and voice currents passing over the wires. In addition to this it is found that the nearness of the lines to the river, in this particular case, makes them especially subject to the increased difficulties brought on by the dampness in the air, which is thoroughly impregnated with moisture from the fogs rising from the river.

It is true that vines such as are seen entwined about the poles grow very rapidly, and after they are once started it is only a matter of a few weeks until they reach the stage which is depicted in the illustration. This condition, however, should be recognized as a danger to be guarded against in localities where plants of this nature exist, and proper precautions should be taken wherever necessary. Linemen should be instructed to pay especial attention to this point, and to uproot all vines as soon as started, and if necessary to impregnate the soil with some material which will kill the seeds.

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Storage Battery Charging Over Trunk Lines

By C. L. Garfield.

STUDENTS of automatic telephony and those who are familiar with the experiments which have been conducted with a view to developing a method of charging storage batteries at a distant exchange over a trunk line will be interested in the plan devised and patented by Talbot G. Martin of Chicago, of which the following is a brief description:

The arrangement of circuits and apparatus relates more particularly to the charging of the storage batteries of manually operated private branch exchanges, operating in conjunction with an automatic central exchange, the charging to be done from the central office over trunk lines during the time that such trunks are not actually in service on connections between private branch and exchange lines. This system of charging makes it possible to maintain all storage batteries of an exchange at the same potential, and to regulate the condition of these batteries from the central office without the employment of any extra conductors other than those used for the regular trunk line traffic.

The underlying principle is to have established over the trunk lines under normal conditions a direct electrical connection between the storage battery at the branch exchange and the source of electrical power at the main exchange; and to cut off from all connection with the trunk line both the storage battery at the branch exchange and the charging source at the main exchange whenever the trunk is taken at either exchange for service between the two, thus leaving the trunk line perfectly free for talking purposes. The foregoing conditions are automatically established during the regular operation of the trunks.

Referring to the drawing (Fig. 1), that part of the equipment and circuit to the left of line x-x is installed at the private branch exchange, while the part to the right is the essential part of the main exchange equipment.

Of the manual board equipment B is the trunk jack, connecting through its contacts the tip side of trunk lines A and signal b^2 in series with condenser b^2 to ground b^1 on one side and the sleeve side of trunk line A through contacts 2 and 3 and storage battery b^6 to ground b^5 on the other.

Of the automatic central office equipment N represents the charging generator and M the main office battery, the rest of the equipment shown, with the exception of switch L, being essential parts of the first selector switch, there being, of course, a first selector switch of this type on each trunk line. These selector switches require only slight modification from the regular Automatic Electric first selector line switches, the only difference being the addition on the trunk line switches of the three contact spring, e, e^1 and e^4 on cut-off relay F, and the contact springs g, g^1 and g^2 on post arm switch G. D represents the vertical operating relay of the selector switch which gives to the vertical magnet the impulses which raise the shaft and contact wipers vertically step by step. E represents the rotary operating relay of the switch which closes a circuit through the rotary magnet giving to the shaft and wipers the horizontal rotary motion.

F is the cut-off relay which, when operated, opens the connection of relays D and E to main battery and switches contact e from e^1 to e^4.

H, shown in two places, represents the switch shaft which, when raised by the action of the vertical magnet, switches contact g^3 from g^4 to g^5 and contact g^1 from g^2 to g.

L represents a side switch of any connector switch which is normally closed on the upper contact, but which when the connector is in on a connection is connected to ground l, as shown. J and K are condensers in the talking circuit which continues on to the right of the drawing.

To one familiar with the automatic system of operation the scheme will at once be apparent from the drawings.

The drawing shows the apparatus in the normal or charging condition. It will be observed that the tip side of the line being connected permanently to the jack and drop at the manual end and to operating relay D at the automatic end of the line is really the operating side of the trunk, the sleeve side being used as the charging conductor as shown, current flowing from generator N to ground n, and from the — lead of N over conductor n^1, contacts e^1 and e of relay F, contacts g^2 and g^1 of post switch G, sleeve side of trunk line A and contacts 3 and 2 of jack B to storage battery b^6 and then to ground b^5, completing the circuit.

Suppose, now, that the trunk is taken at the manual board and a plug is inserted in jack B. The insertion of the plug pushes over jack spring b^4, carrying with it spring 3, opening contacts 2-3 and closing contacts 3-4, thus opening the battery circuit at contact 2 and closing the sleeve side of trunk A to sleeve spring b^4 and thence to sleeve strand of cord. Contacts 1-b are also opened, cutting the drop out of circuit. Cords C are, of course, provided with an automatic calling device and a key for throwing it into circuit. The first vertical impulse, over the tip side of the line, will operate relay D and raise shaft H one step (see Fig. 2) and switch contact g^1 from g^2 to g and contact g^3 from g^4 to g^5 as the springs g^1 and g^3 have a tension upward, which is overcome by the weight of shaft H and the contact wipers which it carries (not shown in drawing).

This action switches the sleeve side of the line from connec-

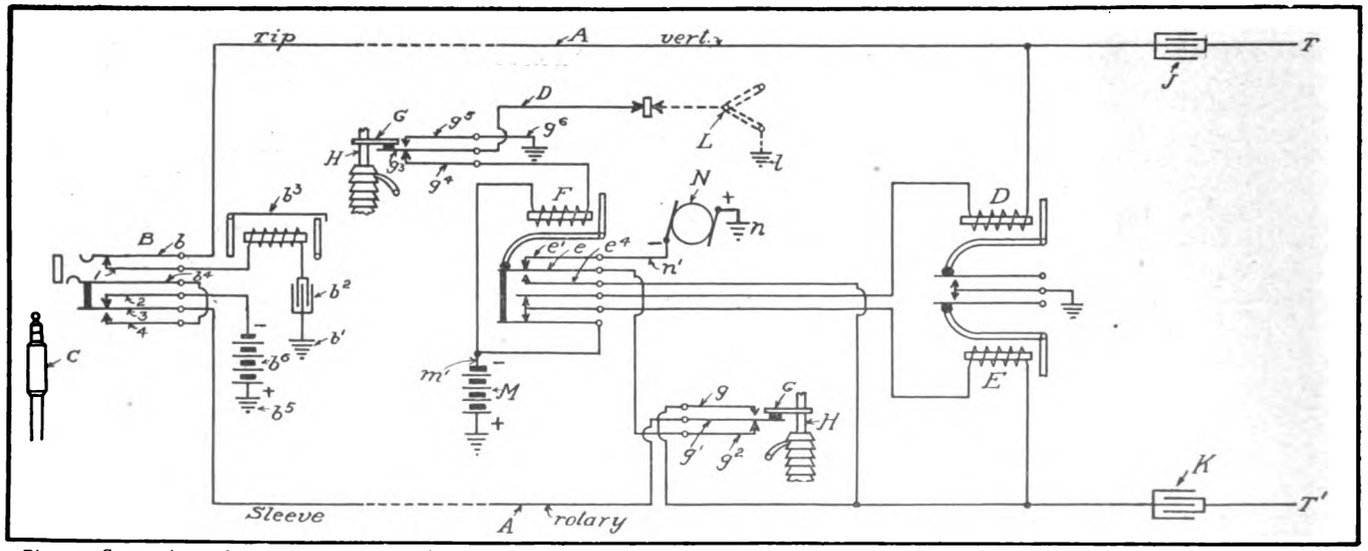

Fig. 1. Connections of apparatus at automatic and manual exchange for automatic connection of storage batteries and charging apparatus, and its disconnection during conversation.

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tion with the charging generator at g^3 to the rotary relay g, closing the circuit to relay E and condenser K; and also switches the contact spring g^3 from cut-off relay F to ground, the latter grounding the private normal P which makes the trunk busy to incoming calls from automatic connectors.

When the switch is released the shaft falls and operates the post switch springs of G to normal or charging condition, at the automatic end of the trunk, and when the plug C is withdrawn from jack B normal conditions are again established at the manual end.

Consider now a call coming in on the trunk from an automatic subscriber's line. As is well known, the call in this case will be made upon the line through a connector switch whose line wipers will come in upon line terminals T and T^1, and as usual such connector switch carries a third wiper known as the private wiper, the latter making contact with the private normal P of the trunk switch. In the contact banks the private P of each line is associated with the corresponding line in each case in such position that when the line wipers of the connector come in upon the called line contacts the private wiper comes in upon the private contact.

After a line has been selected and connected through the wipers by the connector switch the side switch L stands in the lower position as shown in Fig. 1, thus grounding the private normal P at l.

The first selector switch is normal, hence contacts g^3 and g^4 are closed, likewise contacts g^1 and g^2.

The connector switch thus closes a local circuit from battery M through conductor m^1, winding of relay F, contacts g^4 and g^3 of G and private lead P to ground at l, and relay F is energized, switching the rotary or sleeve side of trunk line through contacts g^1, g^2 and e from contacts e^1 to e^4, thus closing the line through to relay E and condenser K and opening the generator connection at e^1. Contacts e^2 and e^3 are also opened from each other and from main battery connection, thus preventing ringing current when sent out over the line from energizing D and E. Ringing current will, however, find a path through drop and condenser to ground b^1 over the tip side of line and from ground b^3 through battery b^6 and contacts 2 and 3 of jack to the sleeve side of line.

The drop will thus be thrown through the agency of the ringing relay of the connector switch (not shown).

When the manual operator answers the call by plugging into jack B, the sleeve conductor of the trunk line is switched from battery to plug and cord as before explained and talking conditions are established. When the calling party releases the connector switch by hanging up his receiver, ground is removed from the private P and relay F restored to its unoperated position, charging being again resumed when the plug is withdrawn at the manual end.

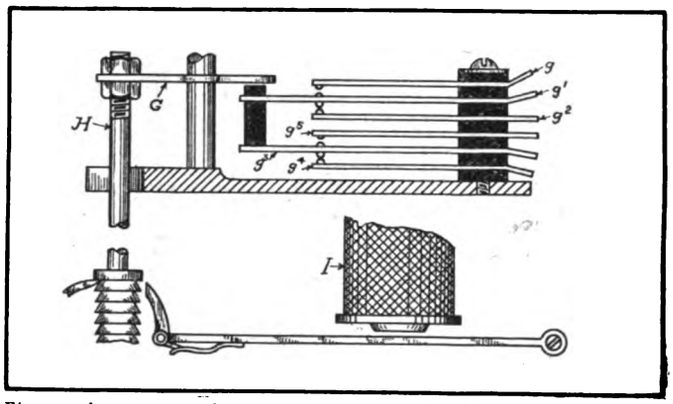

Fig. 2. Arrangement of contact changing switch, which in Fig. 1 is shown diagramatically in two places.

This method of charging storage batteries not only does away with the installation and maintenance of all charging apparatus at the branch exchanges, but relieves the attendant at these boards of the care of keeping the batteries charged and the resultant troubles when such duties are not properly performed, as all storage batteries connected to any exchange may be made to float on the trunk lines, being connected to a constant potential generator or main storage battery at the central exchange.

The larger the branch exchange may be, the greater will be the number of trunks to central, naturally, and as all trunks may be used in multiple to form the charging conductor, the current carrying capacity of the charging conductor will increase in proportion to the size of the battery to be charged.

The system above described is the subject of a patent which has been issued to Mr. T. G. Martin and assigned by him to the Automatic Electric Company of Chicago. Patents have also been allowed Mr. Martin on a somewhat similar system of charging storage batteries in an automatic exchange over trunks from another automatic exchange.

The Kind of a Girl to Select for an Operator and How to Train Her*

By Miss Dempsey, Chief Operator of the Frontier Telephone Company, Buffalo.

WHILE the success of an exchange is not entirely dependent upon the punctuality of its employees, the general discipline of the office is affected if it is not required. Operators who make a practice of hurrying in on the stroke of the hour or a few minutes after, breathless and flurried, are in no condition to take up the exacting work at the switchboard. The embarrassment caused by entering the exchange late does not prevent a repetition of the offence, but the penalty of a few minutes overtime to be worked at the end of the day has proved effectual in remedying the tardy habit.

The student after being examined and accepted, should be placed under the instruction of an experienced operator and allowed to listen in for several days. The names of the parts of the apparatus on the face of the switchboard and their various uses should be learned. Then the system of numbering and the markings, used to denote the change of calling number, telephone removed, etc., should be taken up, and the student thoroughly drilled until she is able to answer any question without hesitation.

After sufficient time has been spent in listening-in and receiving instructions to enable the student to understand the method of operation, the practical application of the rules of the exchange, and the correct phrases to be used in dealing with subscribers, should be taught. No exchange is too small to be benefited by a set of rules for the guidance of its employees. The course to be taken, under circumstances that are likely to arise in the daily handling of the business, should be outlined, and the operators required to conform to their directions as closely as possible. It is advisable to have the rules both brief and comprehensive.

If the student shows upon being examined that she is competent to take up the work, she is assigned to a position at the switchboard, either during the light hours of the day, or next to a skillful operator during regular hours, if her presence does not interfere with the quick handling of the work. Until a student is able to do the work with confidence, and some degree of speed, she should be watched carefully by a monitor

*Abstract from paper read at the convention of the New York Independent Telephone Association, continued from the issue of Sept. 15.

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or instructing operator. The training of a student does not end when she is assigned to a position at the switchboard. In fact, a most important part of her training begins at this time, and great care should be taken to guard against the forming of improper habits of handling cords and plugs, making a careless busy test, and last, but not least, indifferent supervision of connection. I find that it is advisable to consider each mistake or violation of the rules of sufficient importance to warrant correction, but the mistakes should be brought to the student's attention in an agreeable manner. No one should be allowed to give instructions or make corrections in a nagging way. It only causes extreme nervousness in the student, which occasions more serious blunders.

Particular attention should be given to the student's enunciation. Time spent in repetition of numbers and sentences not only wastes the subscriber's time and exasperates him, but will tend to slow the service. It is well known that ordinarily it is more difficult to make one's self understood over a telephone line than in direct conversation, and for this reason greater care should be taken to speak distinctly.

A serious difficulty which is encountered in the small exchanges, from which the larger offices are comparatively free, is the custom generally followed by subscribers of calling by name instead of by number. While this is most convenient from the subscribers' standpoint, one can readily understand how detrimental such a practice is when students begin work at the switchboard. To allow subscribers to call in this way occasions much delay in the work, and the habit should be discouraged. In places where it is found impossible to induce the use of number calls exclusively, the students should be upheld when the service is slow. Knowledge of names and numbers may be a help to quick service, but it should be regarded as an accomplishment rather than as a duty of the operator.

To be a success, an operator must take a lively interest in her work, and feel that she is responsible for a certain part of the whole. Success in this line cannot be attained by mere mechanical effort, any more than in any other business. After the student has served a brief apprenticeship at the switchboard, it takes one but a short time to discover if she be a lackadaisical time-server. This sort of a girl would act as a drawback to the service through her own indifference and by the influence she would have over her associates. However skillful she may be as an operator, her presence in the exchange would be a serious menace. One should not look for paragons of perfection for telephone operators, but it is necessary to make the measure of qualifications commensurate with the high standard of service which the Independent telephone companies have set to be maintained.

Standardization*

By L. E. Knapp.

It has been conceded that the Central and Western States have always been in the lead in Independent telephony, and the question of adopting a standard as to construction methods is one with which the respective State associations have frequently had to deal, and the subject has been brought up a number of times before the National Convention. The National committee has made considerable headway along the lines of a report on the standardization of construction and apparatus, but as yet nothing has been officially adopted by any of the associations. The New York State association should aim to actually accomplish something along these lines by providing that the apparatus used and construction done in the Independent systems throughout the State shall be such as to give the most efficient service possible and at the same time materially enlarge the public appreciation of anti-monopoly conditions.

In the matter of toll service, the weakness of the Independents has not been in the territory they cover, for one is able ordinarily to talk as far as he requires; not in the rates, for they are liberal; not in the quickness of service, for with the customary Independent hustle, calls are sent through with all possible haste; but in the fact that one has oftentimes to go through several types of switchboards and various styles of line construction to reach the person with whom he desires to speak, and when the connection is secured, the service is not as good as it should be because of line and switchboard resistances, leakage and various other causes.

To illustrate, we will say that it is our desire to talk with our well-known and versatile friend, J. Doe, who at the present is residing in Ruralville. We remove our receiver here and, talking over a good copper circuit, state our wants to Miss Toll Operator. She, in turn, calls Adjacent Town, over a copper circuit built along the most rigid lines of proper toll line construction.

Adjacent Town is a magneto system, entirely metallic, and "comes up" fine. Here we are plugged on to the line running to "Somewhere else" which happens to be of the McCluer or Common return type. Business is good in "Somewhere else" and as a result, the "Commons" are a trifle overloaded, and it is here we notice some cross-talk.

Notwithstanding the busy condition of affairs in "Here" the operator is obliging and hastens to switch us on to the line for "Near-by-ville," where we strike a grounded bridging system, which by itself isn't so bad, but on a toll deal, well!

When the drop falls in "Near-by-ville" the operator cheerfully plugs in, and ascertaining our desire, at once connects us with "Ruralville."

Now, when the Ruralville system was started there was none too much money in the treasury and economy of construction was the main consideration, so when "Mr. Sleek Salesman," representing the "Don't Care for Our Reputation Company," came along and showed them how they could build a series grounded system at about one-half the cost his competitor was advocating for a bridging metallic system, they patted his back and gave him the order.

Therefore, when we finally get our childhood chum on a grounded series line on which there are only six other instruments, the conversation that ensues greatly resembles a combination between an ax on the grind-stone and grandfather's coffee mill.

With us, who know these things, allowance is made, but with Mr. Businessman, who is laying down his good "hard earned," excuses don't go. What he wants is talk, good plain talk. He wants to do it himself, too, and not through the medium of some operator who obligingly offers to repeat for him. And bear in mind that one conversation of the nature outlined can do more toward killing your toll business than all of the low rates your monopolistic neighbor can offer in a year.

The primary consideration in exchange operation is service, for upon service does all else depend. Upon the service does the success or failure of the company depend. The subscription list varies according to the service given. Poor service, poor patronage, poor dividends and vice versa. But the service does not depend entirely upon the equipment but the manner in which this equipment is used. Poor equipment may be used so as to give reasonably good service, and the very best of equipment, in the hands of the inexperienced or slothful, may in a short period run a company in such a condition that many liberal doses of standardization will have to be administered before we again see in it the semblance of a good healthy system.

The toll lines especially should be able to give the best service of any in the exchange, and in order that this may be so, it is necessary that some standard of toll line construction be adopted and strictly adhered to.

*Abstract from paper read at the convention of the New York Independent Telephone Association.

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In this connection, I would say that the long distance companies, who are of a necessity giving their time entirely to the construction of toll lines, would be much better able to correctly care for the toll business than others, and it is difficult to see why it would not be more profitable for the local companies to allow the long distance companies to handle the building of all long distance lines and to provide for them accommodations on their switchboards. This would assure all toll lines being constructed in a uniform manner, thereby giving the best of service, and would further allow the use of the time and moneys spent in this direction for the extension and betterment of the local systems.

These long distance companies should adopt a standard set of specifications for their toll line work, and the specifications such as they would naturally adopt would be an invaluable aid in the construction of local lines.

These specifications should cover: Right of way; route of toll lines; the locating of poles; the spacing of poles on straight lines; the spacing of poles on curves and corners; long spans, spacing of road crossings; railroad right of way; the height and diameter of poles; clearing of obstacles; railroad crossings; extension fixtures; spacing of cross-arms; cross-arm fitting; pins and fitting; distribution of poles; method of gaining poles; painting of poles; method of attaching lightning arresters on poles; method of attaching cross-arms; method of bracing cross-arms; stepping of poles; setting of poles; facing of cross-arms; reinforcing and guying poles; anchors and uses; the size and kind of wire to be used; the method of stringing wires; the sag of wires; the location of wires; the method of tying wires; the method of making joints; the method of dead ending; the method of transposing.

The specifications should also cover the method of a toll line entering an exchange so that the manner of answering toll calls and opening the line for test may be exactly the same at all exchanges.

Standard instructions should also be issued for the operators as to the proper handling of toll messages so that an operator accustomed to handling toll calls at any one board might be placed at any other exchange and know, without further instructions, that the manner of handling toll calls was exactly the same in each.

It would be well to have the operator become familiar with the parts of the switchboard, learning the names and functions of each, so that she might more intelligently perform her duties.

The instruction to operators should be general, but deal particularly in the handling of long distance business and should deal with: The proper method of handling an originating message; taking care of delayed calls and explaining the delay to the calling subscriber; the transmission of messages in the event of subscribers not being able to talk with ease; the timing of toll messages; the supervision of toll connections; the handling of outgoing calls; the handling of received calls; the handling of appointment calls; lost calls; reversed calls; the method of routing messages to the best advantage; day rates and night rates; the use of the repeating coil in connecting lines of dissimilar nature; the necessity of immediately reporting all trouble on toll lines; the proper clearance of circuits when messages are completed; on the passing of calls through an exchange; the method of handling calls from pay stations; the collection of messenger charges on appointment calls; the necessity of treating the public in a prompt and courteous manner; the necessity of a harmonious feeling between all toll operators.

Also it might be advisable to issue in simple form, instruction as to the care, testing and repairs necessary on magneto systems for distribution among the new recruits to the great army of telephone workers.

Owing to the existing conditions, it would not be feasible to adopt a standard as to the cable distribution, line routes or types of equipment in the larger exchanges in the cities, but instructions as to how the cable may be hung, how leads may be run, etc., can be fully taken care of in the manners before suggested.

For magneto exchanges, suggestions might by made along the line of adoption of a 4-bar 1,000 ohm instrument as a standard for local and lightly loaded lines, as they give the best service and are more readily interchangeable than any other. For heavily loaded rural lines, however, it would be well to make exception and use a 5-bar 1,600 ohm instrument, as actual practice has proven this best suited for that class of work. Whether they be wired with push buttons so as to ring central without signalling the other subscribers or vice versa, may be a matter of choice with each individual manager. The use of a low capacity condenser in the receiver circuit assures positive ringing on the line in case a receiver is accidentally or otherwise left off the receiver hook.

The suggestions here offered are made not with the idea of forcing a radical change in the equipment of the companies now operating, but to have them so use the equipment they now have that it may give the greatest good to the greatest number. Not to use the cheapest or the most expensive equipment, but to use the best equipment in the manner best suited toward the perfection of Independent service, the satisfaction of Independent patrons and the advancement of the Independent telephone movement.

It lies not alone with the manufacturers, nor with the individual operator or exchange manager to accomplish this result, but it requires the concerted action of the associations and all their members.

FAIR DEAL FOR INDEPENDENT TELEPHONE COMPANIES URGED BY PRESIDENT OF LEAGUE OF IOWA MUNICIPALITIES.

AT the annual meeting of the League of Iowa Municipalities held last week the principal feature of the afternoon session was the address of President J. S. Castor, of Burlington, in which he vigorously denounced the unfair law which operates to give the Bell company an advantage over its Independent rivals, and pointed out that the rate of assessment for taxation was as a rule heavier for Independent companies than for those under Bell control.

He said in part: "The telephone companies secured the adoption by the nineteenth general assembly of the following amendment:

"'That section 1324 of the code of 1873 relating to telegraphs be, and the same is, hereby amended by inserting after the word "telegraph" in the second line thereof the words "or telephone."'

"These two innocent words 'or telephone' inserted in this section means that the telephone companies doing business prior to 1897 can utilize every street and alley without obtaining any further permission.

"But the 'local telephone companies,' which start an exchange after the adoption of the code of 1897, must secure a franchise from the municipality and be governed by it."

This of course gives the Bell companies a great advantage over any new Independent company that may try to operate in territory occupied by them and also acts as a corresponding help to a Bell company attempting to invade either Independent or undeveloped territory.

Mr. Castor urged the passage of laws similar to those which so narrowly failed of enactment at the last legislature, requiring any company contemplating extensions to procure a franchise, thus placing all interests on an even footing.

Taking up the question of tax assessments, attention was drawn to the conditions existing in Polk county, of which Des Moines is the county seat. Here the Bell Telephone Company is assessed for $60.25 per mile, while the Mutual Telephone Company is assessed at $384.60 per mile. At these rates the assessment on the property of the Mutual company in Des Moines is equal to over 9½ per cent of the entire assessment of the Bell company on all the property it owns in the State. The League was urged to make a strong effort to secure some legislation by the next general assembly regulating the telephone companies, putting them all on the same basis, thereby dealing justice to all and removing the only perpetual franchise that works a hardship upon municipalities.

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Test Stations

By Thomas Stanley.

THE cleats used to support the bridle wires on the cross arms are very simple in design and easily made. In Fig. 3 is shown the plan, elevation and end view of a 10 wire cross arm cleat. The dimensions are given. In Fig. 4 are shown the lower sides of two cross arms with the bridle wires in position. The view at *a* shows a case in which the line wires are

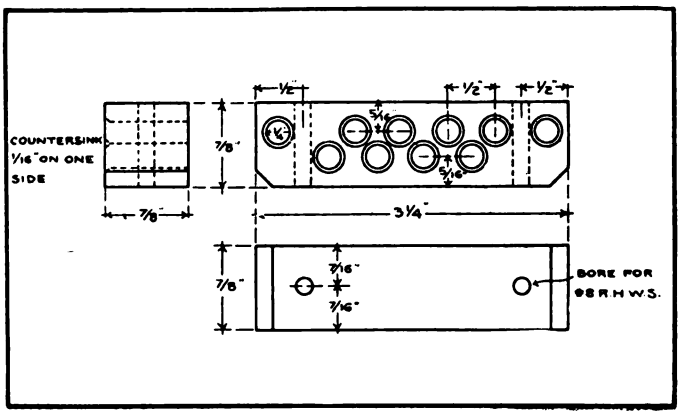

Fig. 3. Working drawings showing construction of 10-wire cross-arm cleat used as shown in Fig. 2.

dead ended east and west. The conditions under which this is done will be dealt with later. At *b* the wires are dead ended one way, which is the condition under discussion. The poles are shown in action at *c* and c^1. The cross arm cleats can be seen at d^1, d^2, *etc.* The space *e* between the cleat *d* and the one on the opposite side of the pole is used to bring down the bridle wires. These cleats are used to make a neat turn in the wires at this point, as they would otherwise sag down and be in the way of a lineman ascending the pole, which would render them liable to injury.

In Fig. 5 is shown the general views of a terminal pole wired up, with the bridle cable entering the cable house. Close inspection of the drawing will show that the cable is looped just beneath the cross arm, and that it is secured to the cross arm at *a*. The method of entering it into the cable house is not shown in detail. The point to be observed, however, is that the pole should be located as near the cable house as possible so that the length of bridle cable necessary can be reduced to a minimum. As has already been stated, the terminal pole should be head and double side guyed. The guys are omitted for the sake of clearness. In preparing the cable for cutting in on the open wires, care must be taken to entail no waste; and to this end the following scheme has been devised. The cross arm having 10 pins, there is a ca-

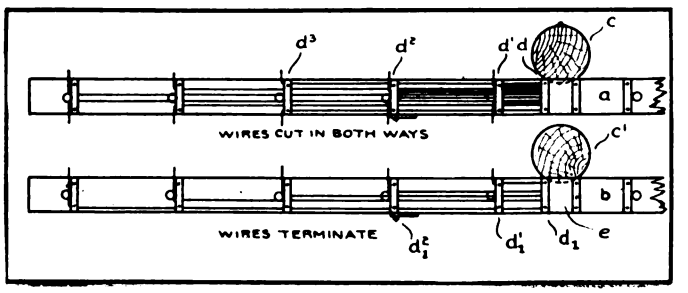

Fig. 4. Views of lower sides of cross-arms showing how wires are run through cleats.

pacity of 10 wires or 5 metallic circuits, and therefore a 5 pair bridle cable is made use of. Referring to the bottom view of the cross arm as shown in Fig. 4 it will be seen that the distance from the center of the arm to the first pin is 8 inches, and that one foot must be added for the distance to each succeeding pin toward the end of the arm. In order to provide sufficient length of cable to allow of the loop shown indistinctly in Fig. 5 being made, the butt of the cable is taken at a distance of 12 inches from the arm. To this figure must be added 8 inches for the distance from the centre of the arm to the first pin. To enable the wire to be properly passed through the hole in the cross-arm cleat, brought up to the line wire and properly soldered thereto 1′ 5″ must be added to this figure, bringing the total length from the butt to the top of the wires that are to be attached to the pole pins up to 2′ 9″. Since the first pair takes

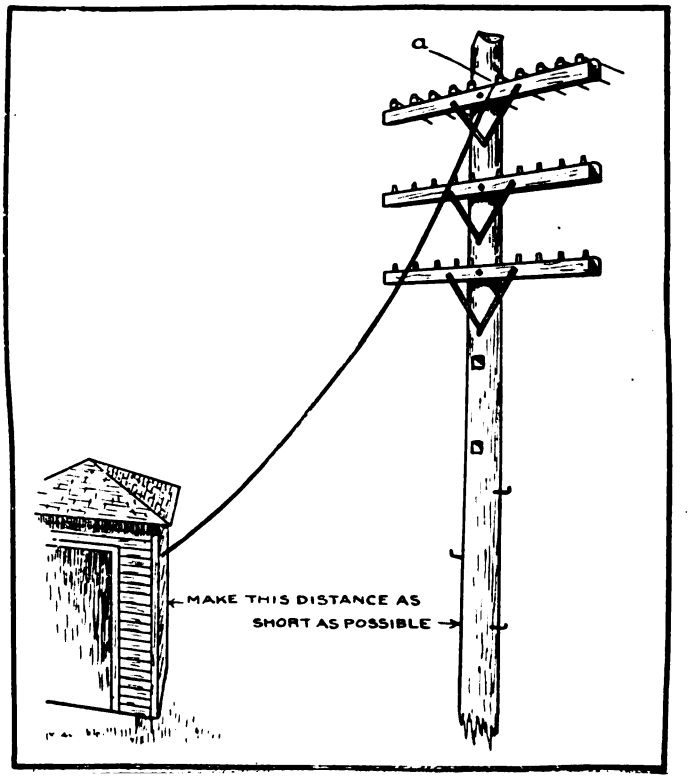

Fig. 5. General view of terminal pole, with open wire lines carried into test station by means of bridle wires.

the pole pins, the two conductors forming it are cut to equal lengths. One conductor of the second pair takes the pin next to the pole pin on the left, so that it must be cut to a length of 3′ 9″, while its mate, taking the second from the pole pin, must be cut to a length of 4′ 9″. The third pair takes the two corresponding pins on the right hand side of the pole, and so must be cut in the same manner as the second pair. The fourth pair takes the end pin and the one next, so that one conductor must be cut to a length of 5′ 9″, while its mate is cut to a length of 6′ 9″. The fifth pair, taking the corresponding pins on the right

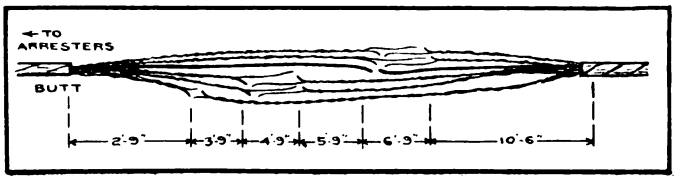

Fig. 6. Method for cutting cable for use at test stations.

side of the pole is cut in the same manner as the fourth. The steel core, shown by the heavy line in the middle, is cut at a point 6′ 9″ from the butt. By cutting the cable in this way, two butts are made and two cable forms obtained, one of which can be used at each cable house. No waste results. The proper way to do is to order in one piece a sufficient length of cable for the two terminals. Then starting at one end and allowing sufficient length for the form for the terminals at the arresters, measure from this butt a distance equal to the run from the arresters up the pole to the butt at this point. From the location of this point expose the wires for a distance of 10′ 6″, and cut as already described. This scheme is shown in detail in Fig. 6.

(To be continued.)

Continued from the issue of August 25th.

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QUERIES

ROUGH TEST FOR CABLE INSULATION.—(768.)

Will you please tell me whether there is any reliable method of testing cable insulation with an ordinary receiver, and if so how is it made?

P. R. N.

When it is suspected that leakage exists in a cable after it has been delivered at the place where it is to be installed, if it is desired to make a rough working test this may be done with a battery and receiver. Although no measurements can be taken by the method which we are about to explain, it will give a sufficient indication of the condition of the wires to enable the tester to determine whether or not the material is fit to install without further tests.

As shown in the illustration, Fig. 768, all the equipment required is a battery of about ten dry cells, a few feet of wire and an ordinary or head receiver. If it is desired to test the insulation of two wires of a pair, one against the other, the covering should be removed from the cable for a sufficient distance to make the wires accessible, and the insulation stripped from the ends of the wires. They should also be opened up at the remote end of the cable, in order to make sure that no contact, however slight, exists at this point. The battery cells should be joined in series, and from one pole of the battery a wire should extend to one of the cable wires to be tested. The other wire of the pair should be connected to a short piece of wire leading to the tester if the end of the cable cannot be easily reached, or connection may be made to the cable wire directly with the wire from the receiver. One pole of the receiver is connected to the opposite terminal of the battery from that connected to the wire in the cable, and the second pole of the receiver is connected to a simple testing wire, with the end opposite from that attached to the receiver stripped of its insulation in order that connection may be made with the cable wire.

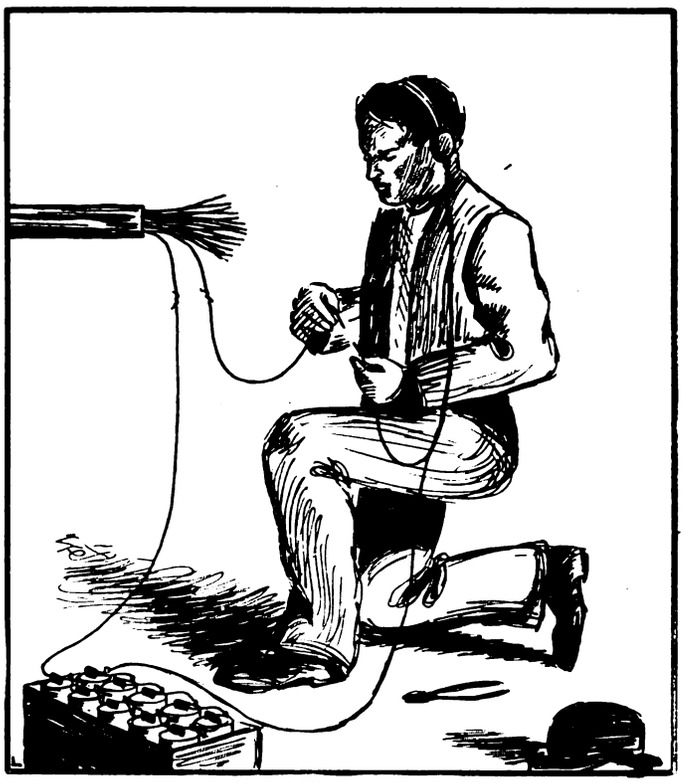

Fig. 768.

The arrangement of these connections and the method of making tests should be clear from the illustration. All that is necessary in order to understand the principle of this test is the statement that the object is to charge the pair of wires to their full capacity at the potential of the testing battery, and if there is no leakage this charge will be retained; while, on the contrary, if the insulation is perfect the charges of opposite potential on the two wires of the pair will set up a current which will speedily neutralize the difference in potential, and the wires will be adapted to receive a further charge from the same battery.

In order to make the test according to this principle, the telephone is brought into connection with the free wire in the cable, and this connection is maintained for a minute or so, until the wires are believed to be fully charged. The existence of this condition may be proved if the insulation is fairly good by breaking and making the connection of the telephone very quickly, and observing that there is hardly any perceptible click in the telephone. After the wires are fully charged the connection through the telephone should be opened, and left open for an interval of about one second; then the telephone wire should again be brought in contact with the cable wire. If at the instant of making contact a click is heard it is an indication that there is leakage in the cable; while if no click is obtained, it shows that the insulation of the wires is good. With a battery of ten cells, and intervals between the breaking and making of one second, it may be roughly assumed that if there is no perceptible click the insulation is equal to 500 megohms, or in other words is practically perfect.

The insulation between the conductors and the sheath may be tested in the same way, by simply wrapping the wire from the battery about the cable sheath, observing that there is no contact between it and the wires at the remote end of the cable.

As this is simply a rough method not much reliance should be placed upon an indication of leakage. Such results from a test of this sort should be considered only as an indication that it is necessary to take the precaution of making correct measurements of the cable with instruments before installing it and connecting it up.

TROUBLE WITH RINGING GENERATOR.—(769.)

For supplying ringing current to our exchange we have a small ringing generator with permanent magnets, which is located in a factory at some distance from the office. It is belted to one of the regular mill shafts, and until recently gave good service. Now, however, it is very unreliable, and we are unable to discover what is the trouble. We would be glad to have you suggest some probable causes for the difficulty.

With a generator of this type one of the most frequent sources of trouble is the brushes, particularly when the machine is located in a factory where the exchange force cannot regularly inspect it, and see that everything is kept in good condition. The brushes are likely to become slightly misplaced, and if this is the case the continued pressure against the commutator causes them to wear unevenly, so that they spark heavily, or do not bear upon the commutator at the proper place, or may even become loose in their supports and move about a little while the machine is running. They should be carefully inspected and trued up if necessary. They should be made to bear evenly upon the commutator without too much pressure. Any roughness which may exist on the commutator, due to sparking, should be removed at this time.

It will be well also to take several readings with a speed indicator to see that the number of revolutions for a given period, of say half a minute, is always practically the same.

If the trouble is not found in any of these things the machine may be tested and carefully inspected for a loose connection of the wiring, which will bring it in contact with the frame, making a partial short circuit; and finally the magnets may be removed and tested, in order to make sure that they have retained their original strength.

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THE EDITOR'S PAGE

PERIODIC TESTING.

TELEPHONE troubles can best be discovered by testing. Experience has shown that the proper use of measuring instruments is the cheapest and surest method of securing the most trustworthy and economical results in maintenance, and this establishes a principle which should be lived up to in every exchange.

It is not enough merely to wait until the service becomes so intolerable that repeated complaints drive the manager to remove the defects which exist in his lines. Troubles should be discovered as soon as they exist, and the best way to bring about this ideal condition is by making periodic tests of all lines. With data showing the readings which should be obtained on each line when it is in a normal condition all defects can be detected and steps for their remedy can be taken at once.

The very undesirable result of omitting this precaution is shown in the photograph showing vines growing on a pole, and in one instance extending for several feet along both wires of a line, which are presented in this issue. Had this line been regularly tested the continuance of such a growth would have been impossible.

SPECIAL EDUCATION OF TELEPHONE MEN.

THE spirit of progress which pervades so thoroughly the telephone field, and inspires the men engaged in all classes of work to exercise their best efforts for the advancement of their own branches, is admirably indicated by the educational work which is now being conducted on an official, or at least a semi-official, basis in so many parts of the country. The object of this work, as now being carried on, is principally to aid the men already in the employment of the various organizations to make themselves familiar with the essential things which will fit them for the rapid advancement which the growth of the business demands. As long as the amount of work to be done increases at the present remarkable rate the number of men required to handle it must be constantly augmented, and no company can afford to let a man capable of further development, and willing to undertake the extra work which is entailed by an active preparation for advancement, remain too long in a position where his energies and natural capabilities will not be fully used. It is the recognition of the truth of this principle, and the great importance of proper action along the lines which it indicates that has been the principal cause of the development of various plans for training men. A further influence is the recognition of the value of creating among all employees a spirit of co-operation, and friendly personal interest in the advancement of the company's interests. This leads to an alertness whereby the men in one department may render themselves materially useful to those in other divisions, frequently in ways which are as unexpected as they are valuable.

One of the methods which has been in operation for a length of time sufficient to prove its worth is the holding of employees' meetings, in which men from the various departments get together at stated intervals and present papers dealing with various subjects of importance and immediate practical interest. Notable success along this line has been achieved, among other organizations which might be mentioned, by the Citizens' Telephone Company of Grand Rapids, where such meetings are frequently held. Here the plan is for men in the various departments to each present a carefully considered paper dealing with some subject especially related to his own work. The subsequent discussion and answering of questions gives all present an opportunity to acquire in the course of time a very fair and accurate knowledge of the entire round of duties devolving upon the members of the various divisions of the company's organization. The active participation of all the higher officers of this company produces most desirable results. So successful has been the working of this plan at Grand Rapids that Mr. Fisher, the secretary of the company, has been able to especially commend to his stockholders in his latest annual report the hearty and intelligent interest in the progress of the company which is shown by all employees in their daily work.

Some of the larger Bell companies have made the holding of monthly meetings, under the auspices of regularly organized societies, a feature which is especially appreciated by employees in operating and maintenance departments. The policy of these societies seems to be rather to take up some one subject in an evening, and consider it from the various points of view of different portions of the staff which come in contact with different phases of the subject. Here, too, the discussion which follows the reading of papers is a most useful feature, although as a rule not sufficiently taken advantage of by those who have the most to gain.

In another portion of this issue is recorded the step taken by the Citizens' company of Columbus, which is arranging to cooperate with the Y. M. C. A. of that city, affording facilities for practical telephone work. In Boston the Y. M. C. A. has for the past two years mantained an electrical course in which some consideration was given to practical telephone work, although the assistance of the telephone company was not rendered in so direct a manner as is proposed at Columbus. The Association, however, employed as instructors men from the telephone company who were qualified to give thorough and useful instruction in those branches of the work which would best fit a man for practical work in the installation or maintenance departments, and the men who took the course were given work which not only taught them how to carry on various branches of practical work, but gave, as far as is possible in the brief time allotted them, a very fair insight into the principles involved in the operation of the least complicated telephone apparatus and systems. It is evident that not all the men who take such a course will be fitted to take positions with a telephone company, if without previous experience. From the standpoint of a telephone company looking upon the students in such a course as possible candidates for employment or advancement it may be looked upon perhaps as a means of weeding out undesirable persons fully as much as an aid to development. It is only fair to allow for a larger percentage of failures than would obtain if the work were directly conducted by the company, and confined strictly to its own employees.

Not merely is the educational influence brought to bear outside of working hours, but in all the largest companies forms a definite factor in the program laid out for the men in nearly all departments. It is probable that no class of employers will be found to exercise a keener interest in the progress of individual members of their forces than do telephone companies, anxious to provide men for the new positions which are constantly being created.

Whatever may be the comparative merits of different schemes, however, as applied to the special conditions prevailing in different localities, the actual results obtained in all seem to bear out the contention that the participation of the company in such plans for the development of its employees is one of the surest means of increasing efficiency, and likewise an aid to the selection of the right man for a position of greater responsibility.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

PARALLELING ANOTHER COMPANY'S LEAD.

I would be very much pleased to have your advice on the following:

1. We desire to build a lead on a public road already occupied on both sides by the Bell. Can we legally set our poles in their lead, between the pole pairs of their wires, using 35 ft. poles (they have 25 ft.)?

2. We have permission from the County Commissioners to erect a pole line on road between road and their lead, but would have to set poles to just clear their wires and of course one half the cross arm would be over their lead. Any light on this will be appreciated. A. B. B.

WHERE the other company occupies both sides of the road, you can legally set your poles in their lead as proposed. The use of thirty-five foot poles where they have twenty-five foot poles would enable you to avoid interference with them. It has been held in a well considered case that overbuilding is a proper method of construction. Chicago Telep. Co. v. Northwestern Telep. Co., 65 N. E. 329. There is no established rule of law that overbuilding is a proper method of construction, but the principle that guides the courts is that the company building later must so build as not to interfere with the lead already established. As a matter of telephone practice, overbuilding can be more safely accomplished than underbuilding. The decision quoted is an application of these principles, which we believe would also be applied in the circumstance you put.

In the situation described in your second question, the projection of one half of your cross arm over your competitor's lead would not amount to interference and would be perfectly legal and proper. This is based upon the principles already set forth.

VESTED RIGHT IN STREETS.

Is there any case anywhere deciding that a telephone company can acquire a vested right to use the streets of a municipality? J. R.

A LICENSE lawfully granted to a telephone company by a municipality to erect poles and wires in certain designated streets cannot be revoked by the municipality at its pleasure, after the company has put up poles and wires in reliance thereon. The company thereby acquires a vested right to use such streets, which continues so long as it conforms to the condition of its license. This was decided in Village of London Mills v. Fairview-London Telephone Circuit, 105 Ill. App. 146.

DANGEROUS PROXIMITY BETWEEN TELEPHONE AND ELECTRIC LIGHT WIRES.

AT Shreveport, La., the wires of the Shreveport Telephone Company and of the Shreveport Gas, Electric Light and Power Company, Ltd., are on the same side of the street. The telephone company's poles are taller than those of the electric light company and its wires are strung ten feet higher. For connecting with a house on the other side of the street, two of the telephone wires were run slanting downward to a lower pole on the same side of the street, a distance of about eighty feet, then across the street to the house, then down the side of the house, and finally under the house, two feet from the ground. On their way downward they passed through the group of wires of the electric light company. This brought one of them so close to one of the heavily charged wires that the two would touch in swinging, and the result was that the insulation of the heavily charged wire was either worn off or burned off, and that the otherwise harmless wire going into the house became itself dangerously charged. After this situation had lasted more than nine months and the telephone had been removed for more than three months, an accident occurred which resulted in serious injury to two small boys who were at play near the house, and came in contact with the wire. A verdict was rendered against both companies, which were sued jointly. The telephone company admitted its liability, while the electric light company appealed the case to the Supreme Court of Louisiana. The court held the electric light company liable on what was called the "incontestable ground" of its failure to have known and remedied this defective construction which had been a standing menace for more than nine months. The judgments recovered by each of the small boys, in one case $500 and in the other case $8,150, were held to be not excessive. Simmons v. Southern Gas, Electric Light & Power Co., 41 S. 248.

VIOLATION OF AGREEMENT NOT TO SELL OUT TO ANOTHER COMPANY.

AN important case involving the damage to be recovered for breach of an agreement not to sell out to another company has been decided at Chester, Pa., during the last month. It is entitled the Borough of Ridley Park v. The United Telephone & Telegraph Company. On November 6, 1901, the borough enacted an ordinance granting consent to the telephone company to erect and maintain poles and wires within the limits of the borough. The ordinance provided that the company should within thirty days after the approval of the ordinance furnish the borough a bond in the sum of $1,000 to indemnify the borough from all damages that might arise by the erection of poles, stringing of wires, and trimming of trees. It was also provided that in case the telephone company "should sell out or in any manner be controlled by any other company, then the entire amount of bond is to be forfeited." The bond was duly executed in accordance with the provisions of the ordinance. About a year later, the company devised and leased Frank R. Shattuck all its lines and systems of telephone within certain territory, in which it included the borough of Ridley Park. In 1904 suit was brought on the bond, the statement of claim alleging its forfeiture because of the sale to Frank R. Shattuck. The affidavit of defense was that the ordinance was void, that the officers of the company were without authority to sign the bond, that the bond was void as a contract in restraint of trade, that the company did not sell out to any other company, but merely leased to an individual, and that the borough had not been damaged in any way by the execution of the lease.

The court held the ordinance and bond to be a binding contract between the parties. It decided that the directors had power and authority to execute the bond and that the corporation was estopped from setting up the defense of ultra vires. Counsel for the company contended that the borough should not recover because it had been authorized by decree of court to cut down the poles and wires of the company erected under the authority of the same ordinance; in other words, that the court had declared the company to have forfeited its right to maintain its lines in the borough of Ridley Park. The court overruled this defense on the ground that it would enable the defendant to take advantage of its own wrong. The court held that the lease to Shattuck of all the corporate rights, franchises and property of the company for nine hundred and ninety-nine years for $10,000 a year for two years and $1 a year thereafter was for all practical purposes a sale. It was also decided that it was no straining of words or terms to hold that this transfer to Shattuck was a violation of the spirit of the contract, and that the word "company" as used included an individual. The court specifically stated that it did not consider the contract in restraint of trade. Judgment was accordingly given for the plaintiff for want of sufficient affidavit of defense.

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IN THE OPERATING FIELD

INDEPENDENT TELEPHONE COMPANY OF LAFAYETTE, IND., ISSUES NEW STOCK TO PROVIDE FOR EXTENSIONS.

STOCKHOLDERS of the Lafayette Telephone Company have decided to issue new stock to the amount of $150,000. Part of the money derived from the sale of stock will be used in equipping the plant and improving the service. A modern switchboard of sufficient capacity to meet the demands of the public will be installed. The wires in the business portion of the city are to be placed underground and other improvements are to be made, which include the equipment of a new exchange building. The company has been increasing its business ever since it was organized and now has a patronage that warrants it in providing a thoroughly up-to-date plant and giving the very best service that can be produced.

A POINTED QUERY FOR BUFFALO CITIZENS.

RECENTLY people interested in telephone service in Buffalo N. Y., have been receiving postal cards bearing upon the front in attractively arranged type the following: "From The Frontier Telephone Co., Buffalo, N. Y. Competition has improved your service and reduced your rates. Who did it?" That the Frontier Telephone Company did it, and is keeping well at it on a large scale, is made evident by the very interesting view of the company's large operating room which appears on the back of the card.

RECORD-BREAKING GROWTH OF INDEPENDENT BUSINESS ON THE PACIFIC COAST.

PROGRESS of the Independent systems in the extreme West continues at a rate which exceeds the expectations of even the most confident telephone men. C. H. Judson, who is now chief engineer of the Independent Telephone Company of Seattle, states that in May there were ordered a large number of switchboard extensions and new boards which were intended to provide for the increase of business until next spring. So far have the demands for telephones exceeded the estimates for growth, however, that already requisitions have been made for further extensions to all these boards, although the work on two of them has not yet been completed. The people of Seattle are fully alive to the improvements which have been brought about by the Independent company.

KINLOCH COMPANY OF ST. LOUIS MAKES IMPORTANT EXTENSION OF ITS SYSTEM.

BY the purchase of the Wabash Valley Telephone Company, of Paris, Marshall and Chrisman, Ill., the Kinloch Independent Telephone Company, of St. Louis, Mo., has secured connection with 5,000 more Independent telephones. The company also gets connections with nine other Illinois towns formerly connected only with the Bell Telephone Company. The Bell company also had connections with the Wabash Valley Telephone Company, but the connections have been discontinued. The lines of the two Independent companies have already been connected.

TELEPHONE WAR AT CUMBERLAND, OHIO.

AT Cumberland, Ohio, subscribers of the Central Union Telephone Company and the United States Telephone Company have been engaged in a contest, both legal and illegal, for several weeks past. The manager of the Independent company has caused the arrest of several prominent leaders of the gang that cut the wires of the United States Company, while on the other hand an injunction has been secured by William S. Hickman and thirty-four others against Samuel C. Herdman, Harley M. McKee and John B. Rhodes.

The plaintiffs state that they and the defendant McKee are the sole and only members of the Home Telephone Company, owning a line between Spratt and Cumberland, 3½ miles of which is in Muskingum County. It is alleged that the plaintiff Hickman is manager of the company and the only person in whom authority has been invested to act for the company.

It is further alleged that the defendants have, with the assistance of agents, been trespassing on the line by cutting and in part destroying it, and by attempting to take possession of it and converting it to their own uses. They allege that unless immediately restrained they will continue their trespassing and the court is asked to issue temporary and permanent injunctions to prevent further molestation.

FAILURE OF A MUNICIPAL TELEPHONE SYSTEM TO GIVE SATISFACTION IN FRANCE.

MUNICIPAL telephones have proved a failure in Nantes, France. A petition bearing nearly 10,000 signatures has been presented to the Minister of Commerce, each name representing a subscriber paying $80 a year to the government. The petition reads in part as follows:

"The oldest among us recall with regret the years when a private company ran the telephone system. We were then treated with remarkable punctuality and politeness and if we were not treated decently we were able to secure redress immediately. To-day we are able to communicate with each other only when the government functionaries please. Sometimes we are cut off for weeks at a time from the three cities which are especially important to our industries—Paris, Angers and Rennes. Since under state management the system is a loss to the treasury and a failure for industrial uses, we beg you to prepare a bill to present to Parliament restoring the concession to private parties."

THE RURAL TELEPHONE THE BEST THING FOR RUNAWAY BOYS.

THE farm telephone is continually giving new evidence of its usefulness.

From Avoca, Wis., comes the tale of how Johnnie Winkle, a Chicago fresh air boy, tried to find out what would happen if he put a cat on a horse's head. He learned, for the horse immediately threw the cat on the ground and jumped on it. At this stage of the game Johnnie decided to clear out. The boy had a good start, but the people on the farm used the telephone and by the time the boy had reached the next house the people were on the lookout, and stopped him.

PRIZE CONTEST TO INCREASE USE OF INDEPENDENT TELEPHONES IN NEW PHILADELPHIA, OHIO.

THE Tuscarawas County Telephone Company, New Philadelphia, O., aims to extend the use of the telephone to "every person whose income will permit him to ride on a street car." It proposes to make the people themselves its contract agents, and has offered prizes to those who cause the largest number of contracts to be signed.

These prizes are open to either those who actually secure the new subscribers or to those who give the company information which enables it to secure the contracts. This means that when a person interested in this contest hears any one speaking about putting in a telephone, or has an opportunity of bringing up the subject in conversation, if he thinks there is any chance of placing an instrument he notifies the telephone company, which at once sends a solicitor to close the contract. Excellent results are reported already, although this plan has been in operation only a few days, and will continue to the end of the year.

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TELEPHONE AS AN AUTOMATIC PROTECTOR.

A TELEPHONE in the house is something of greater use in time of emergency than the subscriber is likely to think when he orders the instrument. An example of this occurred recently at Phillipston, Mich., where Mrs. Lizzie Turner was assaulted by one Charles Hager, her farm manager, while he was intoxicated. It came out in a hearing that at the time of the assault Mrs. Turner started to telephone to a neighbor and was prevented from talking by Hager, but this neighbor, three-quarters of a mile away, through the telephone, heard Mrs. Turner say: "Don't strike me, Charles!" and then heard a sound as of a body falling. He hastened to the rescue.

SUBSTANTIAL GROWTH OF BUSINESS OF CITIZENS' TELEPHONE COMPANY OF GRAND RAPIDS, INDICATED BY REPORTS OF OFFICERS.

REPORTS to the stockholders of the Citizens' Telephone Company of Grand Rapids, Mich., by its officers indicate that during the year ending July 1, 1906, the company has, as usual, made most gratifying progress, and its growth has been well distributed throughout the entire system.

The following list of exchanges shows the number of telephones in service July 1, 1905, and July 1, 1906:

	July 1, 1905.	July 1, 1906.		July 1, 1905.	July 1, 1906.
Grand Rapids	6,633	7,823	Kent City	15	5
Allegan	370	541	Kingsley	111	114
Alto	64	112	Lake Odessa	62	166
Athens	99	145	Lansing	1,791	1,877
Amble	3	3	Leland	10	15
		now	Leroy	—	22
Bailey	30	Grant	Lowell	364	388
Baldwin	33	28	Luther	46	58
Bellevue	102	295	Manton	105	170
Belding	359	422	Marion	37	78
Big Rapids	10	9	Mason	294	313
Byron Center	80	98	Mesick	22	55
Cadillac	853	1,011	Middleville	256	297
Caledonia	172	218	Morley	12	38
Cannonsburg	18	24	McBain	38	46
Cascade Springs	49	50	Moline	123	116
Casnovia	10	6	Maple City	15	34
Cedar City	21	17	Nashville	278	311
Cedar Springs	173	185	Newaygo	56	88
Clarksville	164	172	Northport	25	28
Coral	36	45	Omena	5	6
Dimondale	202	208	Old Mission	47	59
Dutton	54	81	Otsego	—	1
Evart	180	200	Paris	3	2
Empire	13	15	Portland	540	592
Fellows	48	53	Potterville	158	160
Freeport	131	169	Provement	5	5
Fremont	180	192	Reed City	—	246
Gowan	—	1	Rockford	292	297
Grattan	42	41	Sand Lake	56	98
Grawn	7	27	Saranac	—	210
Grant	41	69	Sherman	25	53
Greenville	562	602	Sparta	30	10
Harrietta	10	20	Suttons Bay	29	32
Harvard	6	39	Traverse City	1,343	1,499
Haslett Park	—	4	Trufant	28	28
Hastings	538	559	Tustin	53	93
Hersey	21	23	Vermontville	347	406
Holland	779	853	White Cloud	21	38
Hopkins Station	38	74	Wexford	10	30
Hudsonville	18	29	Zeeland	138	170
Ionia	606	684	Zutphen	8	—
Jamestown	3	56	Leelanau Co. Toll Sta.	12	6
Jenison	30	29	Toll Stations	138	152
Kalamo	6	—		19,742	23,644

There was an increase of 3,902 telephones in the system during the last year, 1,190 of which were in Grand Rapids. This is the largest net gain in the Grand Rapids exchange since it has been built. The growth outside of Grand Rapids has been almost entirely in established exchanges, only a few new ones having been added during the year.

The report states that farmers in several parts of the state have organized co-operative companies, built their own lines and installed their own telephones. The policy of the Citizens' company has been to connect with these rural companies wherever equitable terms could be agreed upon, with the result that the company is connected with and does switching for many rural subscribers besides those where the company owns the lines and apparatus. There were added during the year 91 miles of poles and 348 miles of No. 10 copper wire.

An annual decrease in the ratio of gross expenses (excepting profits charged off to depreciation) to the income, showing the healthy financial condition of the company, is indicated by the following figures showing the percentages for each year since 1897:

1897	70%	1902	64%
1898	65%	1903	57%
1899	71%	1904	57%
1900	65%	1905	54%
1901	59%	1906	52%

In the secretary's report is included a table which gives a summary of the salient statistics of the system from the time of the company's organization to June 30, 1906, as follows:

	Capital Stock Issued.	City Telephones in Service.	Telephones in Entire System.	Toll Line Pole Mileage.	Toll Line Circuits Mileage.	Toll Points Citizens' System.	Gross Earnings.	Dividends Paid.
1896	$47,600	832	—	—	—	—	—	—
1897	86,735	1,976	—	—	—	—	$43,742.05	—
1898	129,960	2,339	—	—	—	—	57,524.50	$7,737.00
1899	205,850	2,915	—	200	400	—	72,832.56	13,493.43
1900	391,125	3,347	5,459	400	900	84	104,173.81	22,971.68
1901	571,380	3,588	6,960	774	1,660	88	147,557.64	39,544.32
1902	847,065	4,523	10,496	858	1,917	105	198,110.98	56,255.75
1903	1,212,880	5,165	13,981	1,020	2,164	107	274,343.79	82,777.73
1904	1,609,280	5,605	16,388	1,116	2,453	130	343,392.43	112,150.16
1905	1,910,985	6,633	19,742	1,352	3,008	138	418,441.27	139,551.63
1906	2,324,940	7,823	23,644	1,444	3,356	156	498,687.67	168,902.33

The report of the secretary closes with the following significant commendation of the work of the company's employees:

"The year now closed has been very busy, useful and prosperous; take it all in all the best year in the history of the company. Not a little of its success is due to the wise zeal, energy, fidelity and loyalty of your employees, numbers of whom are stockholders in the company, and all have acted as though they felt themselves the individual owners of the property and bound to work for its success as such."

TELEPHONE COMPANY AT COLUMBUS, OHIO, TO ASSIST Y. M. C. A. IN EDUCATIONAL WORK.

IN conjunction with the Y. M. C. A. of Columbus, O., the Columbus Citizens' Telephone Company will make a novel experiment the coming winter, beginning October 1. The Y. M. C. A. usually offers a course of studies in its night school, and one of the departments this year is telephony.

The Columbus Citizens' Telephone Company will give the students of this department the use of its switchboard room containing automatic equipment for a class room during certain hours, and will extend to the students every facility for making themselves familiar with telephone equipment and service.

The instruction in this department will be under direction of Charles S. Owen, who is also connected with the Citizens' company. The purpose is to convey a fair knowledge of the theory of electricity and the principles governing the transmission of sound and speech by the telephone together with a practical knowledge of equipment and construction.

The first four lessons of the series will cover a review of the elements of electricity, magnetism and accoustics upon which telephony depends. The history and development of the telephone will then be taken up.

Later on in the course the students will be taught about the building of telephone lines, aerial and underground construction, switchboards, splicing and testing of cables, storage batteries, and all exchange equipment in an order best suited for the proper understanding of each step in the construction and maintenance of telephone plants.

It is expected the plan will be beneficial to both the students and the company, as the men should be able to take up regular work rapidly and intelligently after the completion of such a course of study.

THE CIRCUS AND THE TELEPHONE.

THE telephone has penetrated into many strange places and in all has proved its usefulness. Now from Norfolk, Va., comes the report of another new and commendable application. A traveling circus has installed a telephone in its ticket wagon and connection is made with the local exchange whenever the circus reaches a town in which a performance is to be given. It is thus possible for anyone desiring to engage a "reserved" seat in advance to do so by telephone without the necessity of an extra and perhaps inconvenient visit to the grounds.

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TELEPHONE PATENTS

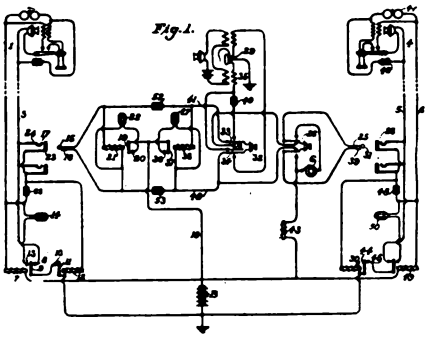
TELEPHONE SYSTEM.

Isidor Kitsee, Philadelphia, Pa., patents (No. 827,918; dated Aug. 7, 1906; filed April 1, 1904; serial No. 201,124) telephone system.

The inventor claims that improvement in transmission is obtained by employing a metallic telephone circuit composed of alternate lengths of copper and iron wire arranged so that in the two limbs of the circuit an iron section parallels a copper section, but with copper sections of greater length than those of iron.

TELEPHONE SYSTEM.

Elmer R. Corwin, Chicago, Ill., patents (No. 827,787; dated Aug. 7, 1906; filed Dec. 15, 1904; serial No. 236,958; and assigns to Monarch Telephone Mfg. Co., Chicago, Ill., a telephone system.



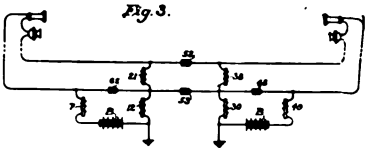
The inventor provides for a central energy telephone system so arranged that during conversation the line relay, cut-off relay and supervisory relay are all connected in series with the line. Fig. 1 shows the circuit in detail and Fig. 3 shows an outline of the connections. In both figures, 7 and 49 are line relays, 12 and 30 cut-off relays and 21 and 38 supervisory relays.

When the line relay 7 is energized on the removal of the receiver by a construction which adapts the armature 9 to make contact with the piece 13 before breaking from the piece 8 a circuit will be closed through the line lamp 14 before the ground is removed from the limb 3 at the point 8. After this circuit is broken the lamp is illuminated by current flowing through 13, 9, 10 until the circuit is broken at 10 by the energization of relay 12 when the operator plugs in.

When the receiver is off the hook with the plug in the line jack current passes from the negative side of battery *B* through relay 7, wire 2, the telephone, wire 3, jack 24, tip 15, relay 21, sleeve 16, 23, relay 12, to ground. Both line and supervisory lamps are thus extinguished. Hanging up the receiver allows relay 21 to release its armature, lighting the supervisory signal.

The passage of current through wire 18, lamp 22, sleeve 16 to the cut-off relay and ground maintains the excitation of the cut-off relay until the operator removes her plug.

The busy test is obtained through the passage of current from the sleeve of a jack maintained at a potential different from that



of ground (the condition existing when a plug is inserted in a line jack) to the ground at the middle point of the winding of the operator's receiver.

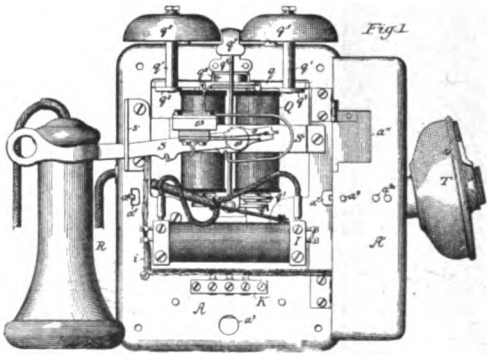
When the operator is listening voice currents are transmitted from line to line through condenser 40. Condensers 52, 53 secure the separation of the two parts of the cord circuit necessary for signalling, but provide a path for voice currents.

The connection of the ringing key through impedance 43 to the line pole of battery *B* provides a means of operating relay 30 when the operator rings a subscriber, thus obviating any danger of setting up a false signal before the operator at an answering position through the operation of relay 49.

TELEPHONE WALL SET.

Ray H. Manson, Elyria, Ohio, patents (No. 829,535; dated Aug. 28, 1906; filed Feb. 28, 1905; serial No. 247,714) and assigns to the Dean Electric Co., Elyria, Ohio, a telephone wall set.

A wall set is described in which the working parts are contained in and protected by a case of peculiar construction. It consists of three main parts, a flat back plate, to which is fastened a hollow base containing the condenser and ringer; and a cover hinged to this hollow base. The three main pieces thus form two compartments, between which is an aperture in the front of the hollow base through which the ringer coils, which are supported on flanges formed by turning in the edges of the aperture, are introduced. Fig. 1 is a front elevation of the wall set with a hinged cover. The induction coil is shown fastened



to the front of the hollow base. The bridge piece which carries the hook switch crosses the aperture for the ringer coils, and is also fastened to the front of the hollow base. For repairs the cover may be opened as shown in the illustration, and the hollow base may be removed from the flat base plate which is fastened to the wall.

MUFFLER FOR TELEPHONE TRANSMITTERS.

George A. Long, Hartford, Conn., patents (No. 821,877; dated May 29, 1906; filed March 1, 1904; serial number 196,067), a muffler for telephone transmitters.

This invention describes a device for impeding the transmission of sound to a telephone transmitter, the object being to cut off vibrations during the time that a telephone user is listening to any one at the other end of the line. The vibrations which affect his own transmitter, and the side tones resulting therefrom prevent his hearing the voice of the person at the other end of the line with the greatest clearness. This is also used in cases where a person wishes to communicate with other persons within hearing distance while preventing the party at the other end of the telephone line, with whom he has been carrying on a conversation, from hearing the words spoken. The apparatus employed consists of a muffler case attached to the front plate of the transmitter by screwing a projecting tubular portion into

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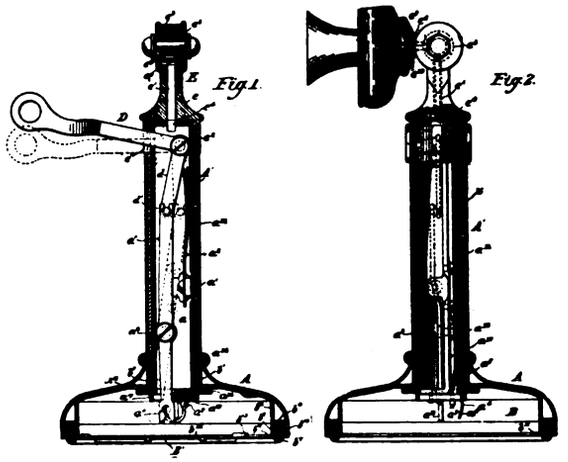
the opening which ordinarily receives the mouthpiece. The threaded opening in the front of the case provides for the insertion of the mouthpiece, in the same manner as it would be placed in the front part of the transmitter. In the muffler is provided a slideway adapted to receive a shutter or deflector, which may be manipulated so as to completely close the opening which normally gives an opportunity for sound waves to pass without disturbance from the mouthpiece to the diaphragm.

DESK STAND.

Ray H. Manson, Elyria, Ohio, patents (No. 829,410; dated Aug. 28, 1906; filed Feb. 28, 1905; serial No. 247,713) and assigns to the Dean Electric Co., Elyria, Ohio, a telephone desk stand.



The invention relates particularly to the standard of the desk stand and the parts contained in the standard and does not relate to the parts contained in the base.

The metal strip which serves as a support for all of the switch actuating mechanism is detachably secured within the tube of the standard by the pin a^5, which engages an aperture in spring a^4. This strip is also permanently fastened to the cap e, which fits down over the tube of the standard as shown. To remove the supporting strip from the tube, it is only necessary to depress the spring a^4 after removing the base plate of the stand.

The disposition of the transmitter leads is easily seen by reference to Fig. 2 and to the hub e^5 of Fig. 1, which has an annular cavity designed to receive them. The standard is secured to the base by nut a^{14}.

METERING OF TELEPHONE SERVICES.

Isidor Kitsee, Philadelphia, Pa., patents (No. 817,920; dated April 17, 1906; filed October 29, 1904; serial No. 230,587) a meter system for telephone lines.

In this invention means are disclosed for recording at the sub-station the charges for a completed call. To accomplish this result a relay is included in the bell circuit of the telephone which when actuated closes another relay circuit bridged across the line wires which is employed to operate a registering device or counter of the usual type. At the exchange the line circuit includes a closed contact jack adjacent to the answering jack and in series therewith. Each operator is also provided with a mechanism to actuate the meter at the sub-station. This consists of a rotary switch adapted to open and close a battery circuit when revolved and including in circuit a two contact plug.

The operation of the system is as follows: After a call is finished and the subscriber hangs up, the operator inserts the plug of the rotary switch in the closed contact jack. Current then flows from the battery connection of the switch through the jack contact of that part of the circuit connecting it to the substation and thence to ground through the relay in circuit with the ringer. This relay is thereby actuated and it closes the circuit of the meter operating relay. If the operator now moves the switch handle over a number of points equal to the time in minutes the line was in use the circuit of the meter operating relay will be opened and closed that number of times, and the registering train will be moved forward to indicate to the subscriber the elapsed period charged for. Thus if the line were in use five minutes, the indicating wheel would be moved forward five numbers.

CARD HOLDER.

James L. Kilpatrick, Philadelphia, Pa., patents (No. 826,336, dated July 17, 1906; filed June 5, 1905; serial No. 263,792) a card holder for telephone transmitters.

The inventor claims that this card holder is an improvement on a card holder described in patent No. 776,728, issued December 6, 1904. In this, the later patent, the card holder described is intended to be stamped from a single piece of sheet metal. There is provided a ring through which the threaded portion of the mouthpiece passes to support the appliance. The parallel crimped grooves which hold the card are compressed when the mouthpiece is screwed up and hold the card firmly in place.

AUTOMATIC TELEPHONE SYSTEM.

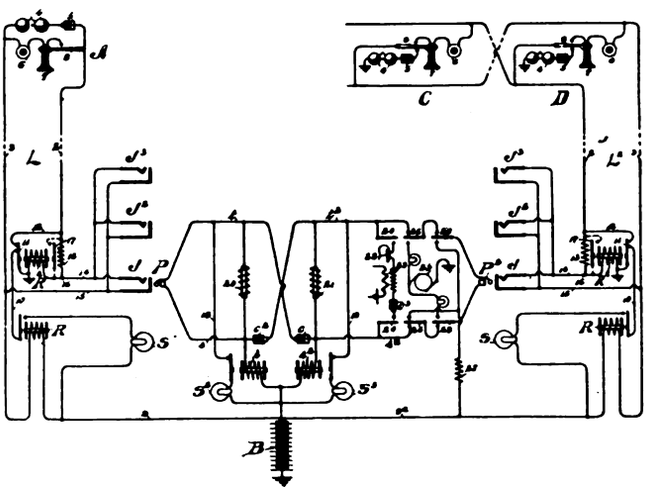
August Alvin Monson, Grey Eagle, Minn., patents (No. 822,973; dated June 12, 1906; filed January 24, 1905; serial No. 242,549) automatic telephone system.

This patent covers the circuit arrangement and apparatus for the automatic switching of telephone connections. The central office is provided with a switchboard, upon which is mounted apparatus adapted to make connections between one line and another when actuated on the step by step principle. Interrupted current is furnished by the interposition at the subscriber's station of a disc having alternate bands of insulating and conducting material, by means of which the desired number of impulses may be created in the line.

LINE AND CORD CIRCUITS.

Harry G. Webster, Chicago, Ill., patents (No. 828,693; dated Aug. 14, 1906; filed December 15, 1902; serial No. 135,235) and assigns to the Kellogg Switchboard and Supply Co., Chicago, Ill., a telephone system.

The inventor provides a telephone system in which a line relay R is connected with one side of the line, and with the other side of the line is associated a cut-off relay R^2 legged to ground. A supervisory relay r, provided, as usual, in the operator's cord circuit is connected in parallel with the line relay when a connection is established. Retardation coils 20 and 21, of about 3,000



ohms resistance, are connected across the answering and calling ends of the cord circuit to provide means of obtaining a busy test, and to prevent short-circuiting of voice currents. A shunt, 13, insures the operation of the cut-off relay when an operator plugs into the line jack, but is cut out of the line circuit by the spring 17 and its contact during conversation. The transposition of the strands of the cord circuit results in legging the two cut-off relays from opposite sides of the through circuit and securing a balanced line.

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

NEWLY DESIGNED TELEPHONE PARTS.

THE development of manual apparatus by the Automatic Electric Company of Chicago, Ill., has been a natural result of the installation of its automatic systems. The necessity for manufacturing transmitters, receivers, magneto instruments, small switchboards and various parts used in connection with apparatus of this class has come up in connection with the making up of wire chiefs, trouble and information clerks' desks, and toll and farmers' line switchboards.

The company has recently issued its first catalogue describing this class of apparatus, and in this book are included descriptions of a number of telephone parts which have features of considerable general interest. The construction of the company's new transmitter, which is fully described in the catalogue, includes several interesting features of design and workmanship. For instance, in assembling the parts accurate measuring instruments are employed to determine the exact location of each part in relation to each other part. By this method it is possible to get all transmitters exactly alike. The electrodes are locked in place in the transmitter front piece by means of clamps requiring special tools to remove them, so that it is impossible for a transmitter to get out of adjustment. The electrode case is completely insulated from the outside case, and as the terminals are mounted on the interior case, it is impossible for any one to receive a shock while using the instrument.

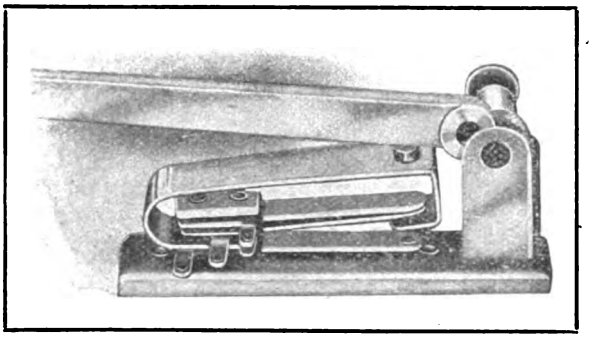

Fig. 1. Hook switch in which neither frame nor lever enters into circuits, manufactured by Automatic Electric Co.

On the regular wall telephones the transmitter front or head is attached directly to the arm, the front end of which is shaped so as to form the rear or back case, completely enclosing the interior of the transmitter. This arrangement is the one illustrated in Fig. 3.

The hook switch which is furnished with each of the company's magneto and common battery manual telephones is made of heavy, half hard sheet brass, so formed as to make a rigid shank. This lever is held in place in the hub support by means of a spring plunger, which is so arranged that it can be opened with the fingers, and the lever removed or inserted at will. The contact springs are formed as shown in Fig. 1, and are made of German silver with pure platinum points. It will be noted that this piece of apparatus is so designed that neither the hook nor base form any part of the circuit.

Another new development illustrated under the head of telephone parts is the carbon block lightning arrester, which is furnished with each of the company's wall telephones. This is so designed that it may be fastened to the woodwork by means of a nut tightened down upon a centre pin, which serves as a ground terminal. The line terminals attached to the block shown at the right of the illustration pass through two small holes in the woodwork, but do not depend upon the woodwork for good contact. In the illustration the arrester is shown open for inspection. To reassemble, all that is necessary is to replace the carbon disc shown at the left against the mica appearing upon the face of the left hand figure. The setting of the thumb nut in position outside of the carbon disc locks the whole combination securely together. Owing to its construction it will be seen that if the mica should be left out the arrester would not only be out of service, but the lines would be short circuited and grounded, which would lead to the immediate detection of the trouble.

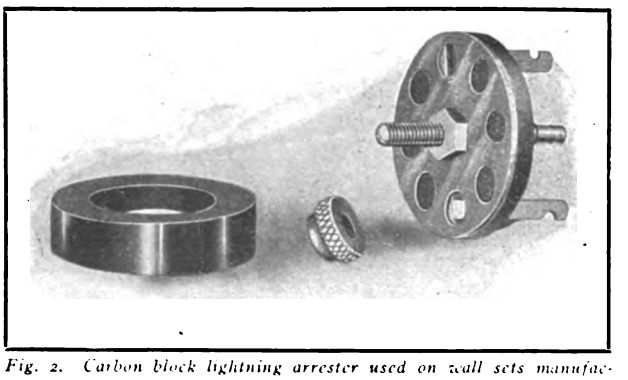

Fig. 2. Carbon block lightning arrester used on wall sets manufactured by the Automatic Electric Company.

Many other features of the line of apparatus which the company has recently determined to offer to the general purchaser are described in the new catalogue. This book is particularly attractive in appearance, in addition to containing much useful information, and will be sent to all interested telephone engineers and managers.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Rochester, N. Y., has recently made public figures showing the remarkable increase in its business beyond the extremely good showing made in corresponding months of last year. Taking these figures up for different periods, the total sales delivered for the first six months of the year amounted to $2,566,772.83, an increase of $841,497.50, or 48.75 per cent. over the corresponding period of last year. The figures given for each month are as follows: January, $324,138.35; February, $443,902.70; March, $546,703.43; April, $467,573.06; May, $386,966.17; June, $397,489.12. The respective percentages of increase over the sales in corresponding months of last year are: January, 54.98; February, 66.08; March, 75.72; April, 48.42; May, 30.78; June, 23.78.

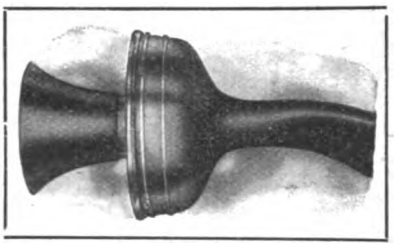

Fig. 3. Wall set transmitter with arm expanded to form back case.

Although the returns for the latter months of this period are less than those in March this is naturally to be expected, as telephone installation proceeds less rapidly during the time covered by these purchases. The company expects to be able to report further heavy increases in its business this fall.

THE TRUMBULL ELECTRIC MANUFACTURING COMPANY, Plainville, Conn., has recently issued a most attractive booklet entitled "How Shall We Know Good Switches?"

The various points which it is necessary to observe in the construction of a knife switch are taken up in detail and illustrated, in such a way as to give prospective purchasers of this class of material information which should enable them to avoid the selection of any defective goods The company will be pleased to send copies of this booklet to interested persons upon receipt of a request.

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Because They Are Automatic

AUTOMATIC Means **You Simply Drop in the Coin**

LEVERS and SPRINGS Mean **Trouble, Confusion and Loss of Business**

Over 150,000 Grays Doing Business

GRAY TEL. PAY STA. CO. HARTFORD, CONN.

Secure Our Catalog

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For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE—10 **SECTIONS** American Electric Company **CENTRAL CALL SWITCHBOARDS**, 105 drops each. **ONE** 1,000 line American Electric **DISTRIBUTING RACK. ONE** 400 line American Electric **DISTRIBUTING RACK.** 14 one hundred line **BURNS TERMINALS**, American Electric. 120 **PAIRS** Kellogg **SUPERVISORY CORD RELAYS.** All in good condition and at a bargain. Portsmouth Telephone Co., Portsmouth, Ohio. 675

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PROPOSALS FOR FIRE-ALARM TELEGRAPH System, Motor Generator Set, Line Material, Portland Cement, Draintile, Charcoal, Lumber, Drill Presses, Reamers, Taps, Machine Dies, Sheet Steel and Lead, Iron and Lead Pipe, Lead Traps and Bends, Journal-box Wedges, Chain Hoists, Vault Door, Steam Regulators, Lawn Mowers, Scythes, Stump Pullers, Clothing, Shoes and Hats, Paper, Index Cards, Bookbinder's Material, Rubber-stamp Material, Glue, etc. Office Isthmian Canal Commission, Washington, D. C., September 14, 1906. Sealed proposals in triplicate, will be received at the office of the General Purchasing Officer, Isthmian Canal Commission, Washington, D. C., until 10.30 a. m., October 2, 1906, at which time they will be opened in public, for furnishing the above-mentioned articles. Blanks and full information (Circular No. 330) may be obtained from this office or the offices of the Assistant Purchasing Agents, 24 State Street, New York City; Custom House, New Orleans, La.; 1086 North Point Street, San Francisco, Cal.; and 410 Chamber of Commerce Building, Tacoma, Wash.; also from Chief Quartermaster, Department of the Lakes, Chicago; Depot Quartermaster, St. Louis; Depot Quartermaster, Jeffersonville, Ind.; Chief Quartermaster, Department of the Gulf, Atlanta, Ga.; and the Commercial Club, Mobile, Ala.—D. W. Ross, General Purchasing Officer.

To the Management of LARGE EXCHANGES NEW OR OLD COS.

We Solicit Your Contracts for

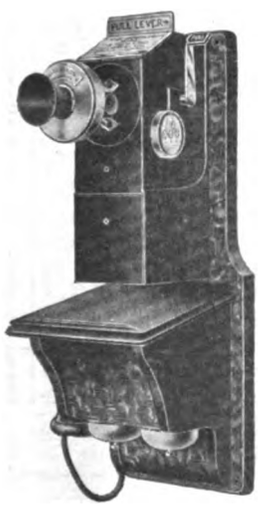
Telephone Accounting and Filing Systems and Auditing Work

Our experts will take the entire responsibility of furnishing our perfected copyrighted Blanks, Forms, Records and Supplies at lowest market prices, install the system and educate your office force.

N. B. Services reasonable. Correspondence solicited. Give size and scope of your company and present office conditions.

THE Edwards-Hine Co.

TELEPHONE SYSTEMATIZING DEPT.
5 and 7 PEARL STREET (EAST), GRAND RAPIDS, MICH., U. S. A.



CASH REGISTERS ON PAY-STATIONS ARE INVALUABLE

¶ They safeguard the integrity of the collector and insure to the telephone company its rightful dues. At $1.00 additional cost they are certainly indispensable.

Write for Bulletin No. 51, Describing Our New Sheet Steel, Up-to-date Machine

BAIRD MANUFACTURING COMPANY, 1506 Briar Place, CHICAGO

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

NEWLY DESIGNED TELEPHONE PARTS.

THE development of manual apparatus by the Automatic Electric Company of Chicago, Ill., has been a natural result of the installation of its automatic systems. The necessity for manufacturing transmitters, receivers, magneto instruments, small switchboards and various parts used in connection with apparatus of this class has come up in connection with the making up of wire chiefs, trouble and information clerks' desks, and toll and farmers' line switchboards.

The company has recently issued its first catalogue describing this class of apparatus, and in this book are included descriptions of a number of telephone parts which have features of considerable general interest. The construction of the company's new transmitter, which is fully described in the catalogue, includes several interesting features of design and workmanship. For instance, in assembling the parts accurate measuring instruments are employed to determine the exact location of each part in relation to each other part. By this method it is possible to get all transmitters exactly alike. The electrodes are locked in place in the transmitter front piece by means of clamps requiring special tools to remove them, so that it is impossible for a transmitter to get out of adjustment. The electrode case is completely insulated from the outside case, and as the terminals are mounted on the interior case, it is impossible for any one to receive a shock while using the instrument.

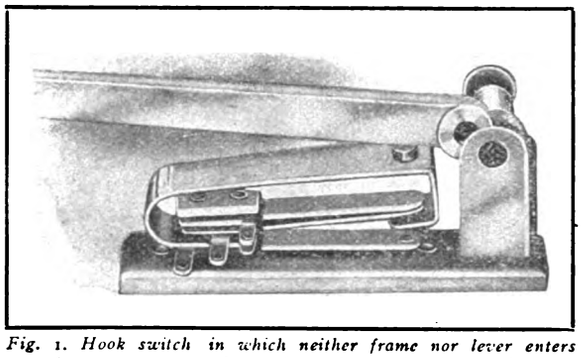

Fig. 1. Hook switch in which neither frame nor lever enters into circuits, manufactured by Automatic Electric Co.

On the regular wall telephones the transmitter front or head is attached directly to the arm, the front end of which is shaped so as to form the rear or back case, completely enclosing the interior of the transmitter. This arrangement is the one illustrated in Fig. 3.

The hook switch which is furnished with each of the company's magneto and common battery manual telephones is made of heavy, half hard sheet brass, so formed as to make a rigid shank. This lever is held in place in the hub support by means of a spring plunger, which is so arranged that it can be opened with the fingers, and the lever removed or inserted at will. The contact springs are formed as shown in Fig. 1, and are made of German silver with pure platinum points. It will be noted that this piece of apparatus is so designed that neither the hook nor base form any part of the circuit.

Another new development illustrated under the head of telephone parts is the carbon block lightning arrester, which is furnished with each of the company's wall telephones. This is so designed that it may be fastened to the woodwork by means of a nut tightened down upon a centre pin, which serves as a ground terminal. The line terminals attached to the block shown at the right of the illustration pass through two small holes in the woodwork, but do not depend upon the woodwork for good contact. In the illustration the arrester is shown open for inspection. To reassemble, all that is necessary is to replace the carbon disc shown at the left against the mica appearing upon the face of the left hand figure. The setting of the thumb nut in position outside of the carbon disc locks the whole combination securely together. Owing to its construction it will be seen that if the mica should be left out the arrester would not only be out of service, but the lines would be short circuited and grounded, which would lead to the immediate detection of the trouble.

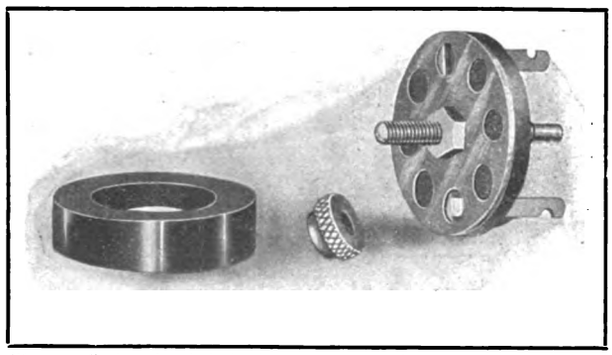

Fig. 2. Carbon block lightning arrester used on wall sets manufactured by the Automatic Electric Company.

Many other features of the line of apparatus which the company has recently determined to offer to the general purchaser are described in the new catalogue. This book is particularly attractive in appearance, in addition to containing much useful information, and will be sent to all interested telephone engineers and managers.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Rochester, N. Y., has recently made public figures showing the remarkable increase in its business beyond the extremely good showing made in corresponding months of last year. Taking these figures up for different periods, the total sales delivered for the first six months of the year amounted to $2,566,772.83, an increase of $841,497.50, or 48.75 per cent. over the corresponding period of last year. The figures given for each month are as follows: January, $324,138.35; February, $443,902.70; March, $546,703.43; April, $467,573.06; May, $386,966.17; June, $397,489.12. The respective percentages of increase over the sales in corresponding months of last year are: January, 54.98; February, 66.08; March, 75.72; April, 48.42; May, 30.78; June, 23.78.

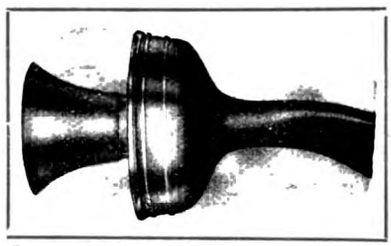

Fig. 3. Wall set transmitter with arm expanded to form back case.

Although the returns for the latter months of this period are less than those in March this is naturally to be expected, as telephone installation proceeds less rapidly during the time covered by these purchases. The company expects to be able to report further heavy increases in its business this fall.

THE TRUMBULL ELECTRIC MANUFACTURING COMPANY, Plainville, Conn., has recently issued a most attractive booklet entitled "How Shall We Know Good Switches?"

The various points which it is necessary to observe in the construction of a knife switch are taken up in detail and illustrated, in such a way as to give prospective purchasers of this class of material information which should enable them to avoid the selection of any defective goods The company will be pleased to send copies of this booklet to interested persons upon receipt of a request.

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LEVERS and SPRINGS Mean **Trouble, Confusion and Loss of Business**

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Our experts will take the entire responsibility of furnishing our perfected copyrighted Blanks, Forms, Records and Supplies at lowest market prices, install the system and educate your office force.

N. B. Services reasonable. Correspondence solicited. Give size and scope of your company and present office conditions.

THE Edwards-Hine Co.

TELEPHONE SYSTEMATIZING DEPT.
5 and 7 PEARL STREET (EAST), GRAND RAPIDS, MICH., U. S. A.

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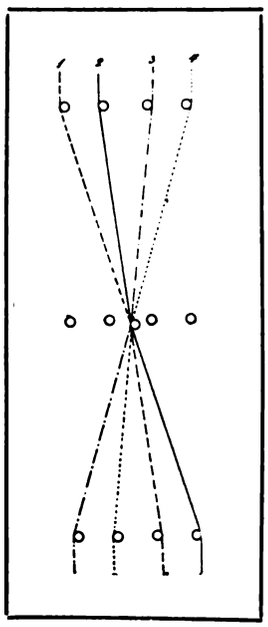

Fig. 1. Plan of transposition; two sides of phantom only, by the Pierce method.

PHANTOM TRANSPOSITIONS.

METHODS of transposing phantom circuits in a way which is said to be especially simple and economical are described by the Peirce Specialty Company, 241-249 South Jefferson St., Chicago, Ill., in a little booklet which has recently been issued. This gives methods which are applicable to transpositions made by the use of the company's new transposition bracket illustrated in Fig. 3 on this page. The company claims that by the use of this bracket there can be made a splice which is "strong, safe, simple, sightly and cheap." It can be thrown in by a stringing gang, and requires no cutting of wires.

In taking up the details of construction the company states that in the transposition of phantom circuits the same rules which apply to the transposition of two sides of a single circuit may be applied to the two sides of a phantom, the two single circuits composing the phantom each being treated as a single wire. It goes on to give certain special information, and says that the use of a four-pin bracket, as illustrated in cuts 1, 2, 3 and 4, accomplishes all the requirements for the several conditions met in practice.

This booklet not only gives figures showing how to use the company's brackets, but gives a very complete description of the work necessary in stringing wires and running in transpositions at the time lines are built. It should be especially useful to many of the smaller telephone companies where the transposition problem has not yet been satisfactorily worked out. Managers of such companies and other interested persons may obtain it without cost by writing to the company.

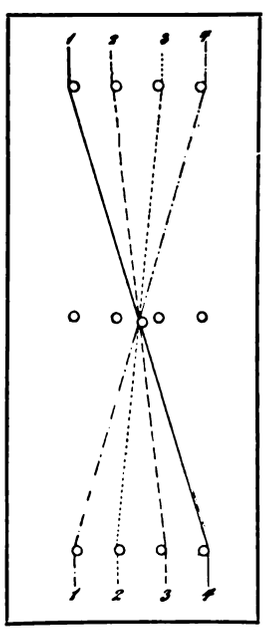

Fig. 2. Plan of transposition of two sides of phantom and both single lines.

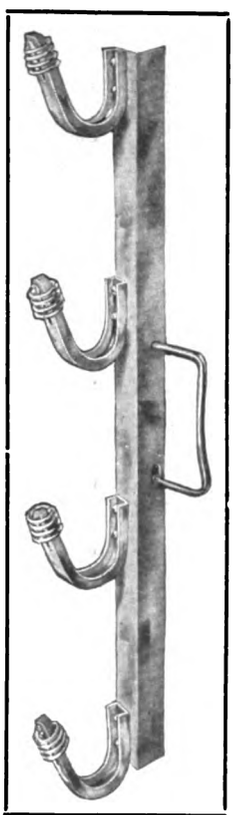

Fig. 3. Steel 4-insulator bracket for phantom circuit transpositions.

THE CARBOLINEUM WOOD PRESERVING CO., Milwaukee, Wis., has recently presented to the public some testimonials to the value of its wood preserving compound, Avenarius Carbolineum, which should be interesting to telephone men. It points out that such careful and successful managers of traction systems, etc., as Stone & Webster, have been using Avenarius Carbolineum wood preservative for years in various parts of the country from Tacoma, and Seattle, Wash., way down to Key West, Fla., for the preservation of pole-butts, cross-arms, ties, etc. The same conditions exist among railroads. The Great Northern Railway Co., acknowledged to be one of the best managed systems, is using it everywhere. The Chief Engineer of the Southern Pacific and Oregon R. R. & N. Co., Mr George W. Boschke, expressed himself last spring as follows:

"Agreeable to your request for my opinion on Avenarius Carbolineum as a wood preservative, I beg to state that my investigations on the subject have convinced me that it is actually a wood preservative, and we expect to make use of it wherever we find it expedient."

The Pennsylvania system is also using Avenarius Carbolineum for the preservation of its poles.

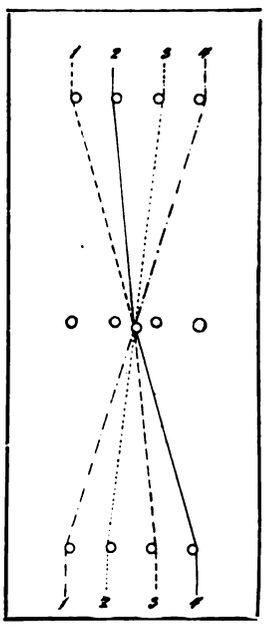

Fig. 4. Plan of transposition of the phantom and also the lower numbered circuit.

THE ELECTRIC MANUFACTURING & EQUIPMENT COMPANY, Atlanta, Ga., is issuing a series of bulletins of uniform size in an attractive binder. The company's price list No. 10, covers magneto telephones of various types. Descriptions and prices of instruments adapted for various classes of work are given, and the illustrations show several interesting features of design. An especially noteworthy feature is the use of a single coil ringer manufactured by this company.

THE STANDARD MANUFACTURING COMPANY, Bridgeport, Conn., expects within a short time to be occupying its new three-story brick building. As soon as this is completed the company will actively engage in the manufacture of telephone apparatus, and will also make a specialty of turned screw machine parts, such as binding posts, check nuts, etc., as well as sheet metal stampings, such as those used for hook switches, transmitters, etc. The company will furnish either complete telephones or telephone parts of any sort as desired.

J. M. SKINNER has purchased the interest of C. A. Byers in the plant of the Toledo Storage Battery Company, Toledo, O., and has succeeded to the management of the concern. The company manufactures telephone, telegraph, and ignition batteries, and expects to be in its new plant at West Toledo, O., very soon.

THE BLAKE SIGNAL & MANUFACTURING CO., of 246 Summer St., Boston, Mass., is about to establish an agency in Canada to take care of its increasing business in that country.

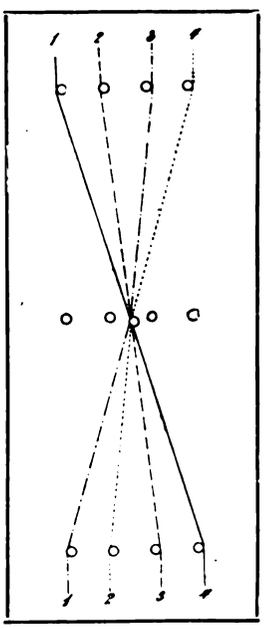

Fig. 5. Transposition of both sides of phantom and the higher numbered circuit.

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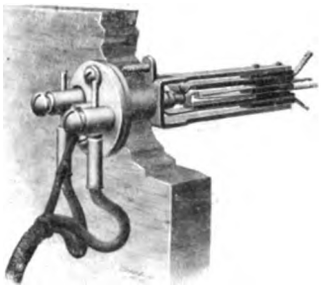
Some Small Things which HELP!

Operator's Head Receiver.

The operator's receiver is of standard design with genuine hard rubber shell. The single piece flexible steel head band is covered with padded leather. The receiver is so attached to band, that it can be swung back and be used as a hand receiver, or if necessary the band can be instantly removed by simply springing the catches out of holes in receiver, there being no screws or pins to take out. The binding posts for attaching cord are mounted inside the shell so there is nothing to catch in operator's hair.

The operator's plug and jack is entirely new. Usually the operator's receiver jack is built with an extremely short handle and it is a very troublesome job to attach the cord, which must have a special end. Not only this but the cord invariably breaks just where it enters the plug, as it receives more wear here than anywhere else. These troubles are absent in the Unitype Operator's Plug, which consists of two binding posts mounted on a flat plate. This plug does not stick out or get in the operator's way, no special cord is necessary—any cord with tips can be used, and it is as easy to attach cord to this plug as it is to an ordinary receiver. Breakage is reduced to a minimum as there is no strain on cord terminals and cord cannot be broken at butt of plug as in other types.



Operator's Receiver Jack.

The Operator's Jack is of special design and consists of four springs, two of which serve to open the transmitter battery circuit when the plug is withdrawn from the jack. This prevents needless waste of battery when operator is not at board.

Get our Bulletins Regarding the Unitype Switchboard

The Sumter Tel. Mfg. Co.

SUMTER, S. C.

The Big Question Where to Buy

THE BEST TELEPHONE APPARATUS

is half settled when you write us for catalogues and prices all settled when you become our regular customer.

Try the first half now—send us list of your requirements to-day.

Central Telephone & Electric Company

Makers High-Grade Telephone Apparatus
Dealers Telephone Supplies (Exclusively)
2131-33-35-37 Lucas Ave., ST. LOUIS, U. S. A.

NEVER SKIPS!

The Calculagraph

never skips a second. It measures the exact time a toll line is in use and prints the result on a card.

Increases the capacity and earning power of toll lines.

IT MAKES NO CLERICAL ERRORS

Write for Booklet

The CALCULAGRAPH CO.

1437 Jewelers Building, New York City

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THE WEEK'S MESSAGES

NEW COMPANIES.

BUSHNELL, FLA.—At a meeting recently held at Sumterville, it was decided to incorporate an Independent telephone company, to be known as the Tropical Telephone Company. The principal place of business will be at Bushnell, and lines will be built connecting all the towns in Sumter county, extending to Ocala as quickly as possible.

LITTLE RIVER, KAS.—The Mutual Telephone Company has been incorporated in this city.

ROCHESTER, KY.—The Rochester Home Telephone Company, of Rochester, has been incorporated with a capital stock of $3,000.

EROS, LA.—An Independent telephone system is to be established at Eros, with a switchboard at Vernon to connect with Jonesboro, Rustou and other points.

HOMER, LA.—A stock company is being formed to install an Independent telephone system at Homer. Dr. Mundy, of Keithville, and a number of prominent citizens of Homer are interested in the enterprise, and the success of the new company is already assured.

HIGGINSVILLE, MO.—The Boland Telephone Company has recently been incorporated in this city.

MOKANE, MO.—At a recent meeting of the stockholders of the Mokane-Tebbetts-Fulton Telephone Company the company was reorganized, and the following officers and directors were elected: President, R. Earle Hodges; vice president, E. C. Holman; secretary, J. W. Ratekin; treasurer, T. F. Hafner; directors, Theo. Beaven, G. W. Stallard and William Hornbuckle. The company has stations in several Callaway towns, and long distance connections with the line at Fulton, the county seat. It is the intention of the new officers to rebuild the company's lines, and make the service first class in every particular.

BROCK, NEB.—The Brock Federated Telephone Company, of Lafayette precinct, Nemaha County, has been incorporated with a capital stock of $5,000. The board of directors consists of J. W. Carlisle, W. A. Lare, Benton Aldrich, R. T. Hawley and Karl Aldrich.

CELIA, NEB.—A new Independent telephone company, with a capital stock of $3,000, has been organized at Celia, Holt county, Neb. The incorporators of the new company are J. F. Hammerberg, L. M. Aldridge and O. Hendricks.

ONEONTA, N. Y.—The Delaware and Otsego County Independent Toll Line Company has been incorporated with a capital stock of $15,000. The main office of the company will be located at Oneonta, and it is its intention to build lines to connect the Independent exchange at Oneonta with the new exchange at Walton, and the Citizens' Standard lines of Margaretville, running through to Kingston to connect with the extensive Independent lines south of that point. This will give a toll line service through many other places of importance directly connected with the Home Telephone Company's lines at Shenevus and other parts of the county. Experienced men are back of the company.

BARRIE, N. D.—A new telephone line is to be built from Barrie as far west as the Ole Graff farm and perhaps farther.

MALTA, O.—Articles of incorporation have been filed by the Malta-Elliott Telephone Company, of Malta. The capital stock is placed at $10,000, and the incorporators are Lee Humphrey, J. L. Benjamin, George Willis, E. E. Scott and J. N. Barlow.

NEW LEXINGTON, OHIO.—Cleveland men have organized the Sunday Creek Telephone Company, which will build exchanges at New Lexington and other points in the Hocking Valley. The company will be affiliated with the Independents and long distance lines will connect all of its exchanges with the United States Long Distance Company. Work on the exchanges will begin at once. The new company will put Columbus in touch with a number of the new mining towns.

CLEO, OKLA.—The Cleo Telephone Company, of Cleo, has been incorporated with a capital stock of $5,000. The directors are as follows: C. R. Williams, Philip Herald, Charles E. Walker, E. E. Christie, Norton Bassett, J. C. Bobbitt, C. J. Chastain and Arthur Hess, all of Cleo.

PECKHAM, OKLA.—The Peckham Central Mutual Telephone Company, of Peckham, Okla., with a capital stock of $1,000, has been incorporated. Among the incorporators are J. Q. Louthan, S. E. Menefee, J. A. Echtennoch, J. D. Cowan, P. T. Wather and A. A. Sherbon.

FRANCHISES.

NEWPORT, KY.—The terms to be complied with by the bidders for a telephone franchise have been agreed upon by the Law Committee of the General Council. It will be a twenty-year franchise, and the successful bidder must agree to pay at least $500 per annum, in lieu of the special license, which has been declared unconstitutional. The company must furnish 10 telephones to the city for the first five years, and one additional telephone thereafter per annum during the life of the franchise. The rates now in vogue shall not be increased, and if the rates are reduced elsewhere the Newport subscribers will receive a similar concession.

JAMESTOWN, N. D.—A. B. Cox has been granted a telephone franchise in this city.

VALLEY CITY, N. D.—The C. O. Wheeler Telephone Company has applied to the city council of Valley City, N. D., for a perpetual franchise, without any maximum charge for telephones.

HOPKINTON, R. I.—The Home Telephone Company, of Providence, R. I., which has already secured franchises in a number of cities in the State of Rhode Island, has applied for a franchise at Hopkinton. If the franchise is granted the company guarantees to give good service at a substantial reduction in price.

PASCO, WASH.—The Independent Telephone Company has secured a franchise at Pasco, Wash., south of Spokane, and will put in an exchange, which will have long distance connections. R. A. Klinge holds the franchise for the local system.

BEHLER, W. VA.—A franchise has been granted to the Behler-Hagans Telephone Company to construct a telephone line over the county roads in Clay, Cass and Grant districts. One of the conditions of the franchise is that the public officers of the county shall be given free services of the proposed line for public purposes.

MILWAUKEE, WIS.—The City Council is considering the application of three Independent telephone companies, the Milwaukee Independent, Milwaukee Automatic and Wisconsin Metropolis. These companies wish to install exchanges and build conduit in Milwaukee.

QUEBEC, P. Q., CANADA.—A telephone franchise has been granted the Bellechasse Telephone Company to enter the city of Quebec, upon conditions to be determined between the company and the city, but no exemption of taxes will be granted.

FINANCIAL.

JONESBORO, ARK.—About $30,000 has been subscribed by the local people for the new telephone company and the company will build an exchange at once.

HUNTINGTON, IND.—The assessed valuation of telephone companies in Huntington County is as follows: Home Telephone Company $160, Central Union Telephone Company $1,978, Lafontaine Telephone Company $480, Landisville Rural Company $315, Liberty Center Telephone Company $120, Majenica Telephone Company $1,535, Markle Telephone Company $3,440, Mt. Zion Telephone Company $60, National Telegraph and Telephone Company $7,380, Roanoke Telephone Company $2,900, Warren Telephone Company $6,560, United Telephone Company $52,275.

HANSKA, MINN.—The Board of Directors of the Hanska Rural Telephone Company has declared a dividend of 6 per cent. on all purchases prior to March 1, 1906.

MINNEAPOLIS, MINN.—Directors of the Tri-State Telephone and Telegraph Company have declared the thirteenth quarterly dividend on the preferred capital stock of the company at the rate of 6 per cent. per annum.

PATERSON, N. J.—As a part of the organization plans of the company a deed transferring property of the Inter-State Telephone Company, of Trenton, from the trustee in bankruptcy for the court of chancery has been filed in Paterson, N. J. The consideration mentioned in the deed

NEWS—WANTED

THE matter contained upon the Message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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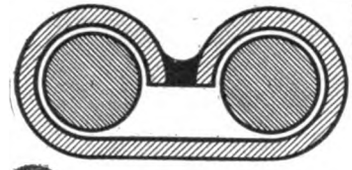

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COOK JOINT AFTER TWISTING.

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In addition to the several yards we have had in the past, we wish to call your attention to our new yard which is located at Escanaba, Mich.

The acquisition of this new yard enables us to ship poles by all railroads or by the lake routes, thereby enabling us to give the best delivered prices.

The location of our new yard makes it easier to secure cars, thus facilitating prompt shipment.

In many cases poles can be shipped by car-ferry, making possible a great saving in cases of shipment to Eastern points.

We are wholesalers exclusively, shipping in car lots only.

Write us for delivered prices and "Pole Booklet No. 3-A." Yours for the asking."

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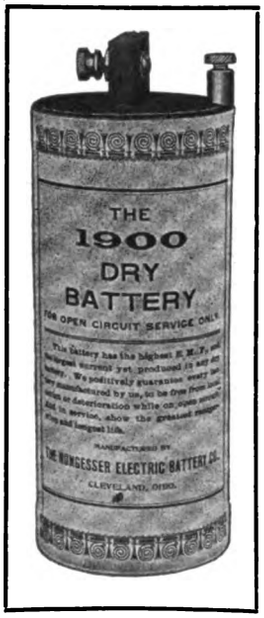
Mr. Exchange Manager



Poor service resulting from exhausted Batteries means much more than the extra cost cheap batteries are sure to entail.

It means dissatisfied subscribers, and such individuals are prone to air their grievances to the detriment of your opportunities for increased business.

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is helping live exchanges all over the world to rapidly extend their service.

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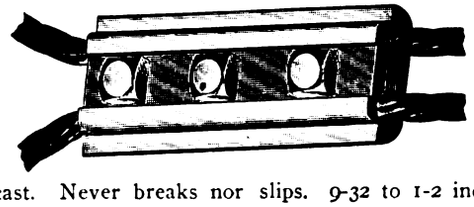

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THE WEEK'S MESSAGES

is $575,000. The second mortgage is drawn in favor of the Mercer Trust Company, and is a general mortgage securing a loan of $4,000,000.

PHILADELPHIA, PA.—The gross earnings of the Keystone Telephone Company of Philadelphia for July were $71,705 and the net earnings $31,903.

SPOKANE, WASH.—The capital stock of the Interstate Telephone Company is to be increased from $100,000 to $500,000, to provide funds for building extensions to the present lines of the company. The company now has 250 miles of telephone lines in operation, and it is its intention to establish an exchange at Spokane.

COMBINATIONS.

CARLYLE, ILL.—The Clinton County Telephone Company has sold its entie system to the Citizens' Telephone and Telegraph Company for $11,000. The officers of the company are: Hugh V. Murray, of Carlyle, president; Henry Schurman, Germantown, vice president; B. H. Donne, Breese, secretary; August Klutho, Breese, treasurer. The company expects to build lines throughout the county.

COLUMBUS, IND.—It is reported that the Citizens' Telephone Company, of Columbus, Ind., will purchase the Hope Independent Telephone Company.

MAYFIELD, KY.—A deal has just been completed between the Home Telephone Company, of Mayfield, and the Planters' Independent Company, of Marshall and Callaway counties. This deal will place the Home in connection with 800 more people and will be of much value to the Home subscribers. Direct connection is now had between Benton, Hardin, Dexter and Murray.

TORONTO, ONT., CAN.—The Stark Telephone Light & Power System, Ltd., which operates in the town of Toronto Junction, where it owns the light and power plant and also the telephone exchange, has purchased the electric lighting plants in both Oshawa and Bowmanville, and is preparing to operate these plants.

ELECTIONS.

OZARK, ARK.—The stockholders of the Home Telephone Company, of Ozark, have elected the following directors for the ensuing year: Will Hill, president; W. J. Pendergrass, vice president; W. C. Conatser, secretary; J. B. Fulks, treasurer; J. C. Carter, director.

SAN DIEGO, CAL.—At the meeting of the directors of the Home Telephone Company, Louis J. Wilde was elected president of the company for the ensuing year, Heber Ingle was chosen as vice president, S. A. Reed as secretary and George B. Woodbridge as manager.

DECATUR, IND.—At the annual meeting of the Citizens' Telephone Company, at which reports were read showing the material increase in the company's business during the past year, the following directors were chosen: J. S. Bowers, F. M. Schirmeyer, E. X. Ehringer, D. D. Clark and Godfrey Christen.

EDGELEY, N. D.—The Pomona Valley Telephone Company, recently organized, has elected the following officers: L. A. Ueland, president; L. P. Ormsby, vice president; O. A. Thompson, secretary; C. M. Washburn, treasurer. The company will shortly establish an exchange at Edgeley, and twenty-four miles of line is to be constructed.

PERSONALS.

V. I. HOLCOMBE, of Tennessee, has recently taken charge of the plant of the South Texas Telephone Company, with headquarters at Austin, Tex.

J. J. JACOBS has been appointed manager of the Wisconsin Telephone Company's exchange at Racine, Wis.

FRED. PATTERSON has been made manager of the Bell Telephone Company's exchange at Wheeling, W. Va. He was formerly manager of the exchange at Bellaire.

New Construction in the Field

LUXORA, ARK.—The Tri-State Telephone Company is building a line from Luxora north along the river in the direction of Barfield, and many of the lines already in operation are being overhauled and put in better shape.

TEXARKANA, ARK.—The Telegraphone Company of Arkansas will begin construction of their lines during the next two weeks between Pine Bluff and Little Rock. Five hundred miles of copper circuits are to be built in the State.

SAN DIEGO, CAL.—It is the intention of the Home Telephone Company to extend its lines to Cuyamaca and the surrounding territory, making it possible for the San Diego subscribers to have connections a considerable distance into the back country. Service to Descanso has already been put in operation, and as soon as the Cuyamaca extension is completed the telephone service will be in working order to Alpine and Viejas, in addition to Descanso and Cuyamaca. Lines have been built from Del Mar to La Jolla, and the company contemplates also the extension of its lines at Nestor.

SAN FRANCISCO, CAL.—Work on an Independent exchange is about to begin at San Francisco. A switchboard with a capacity of 15,000 lines will be installed at once and the system is being laid out to have an ultimate capacity of 80,000 lines.

ELGIN, ILL.—It is the intention of the Interstate Telephone Company to place a portion of its wires underground in Elgin.

WOODBINE, IA.—The Woodbine Telephone Company has completed its copper circuit all the way to Honey Creek, where it connects with the Council Bluffs Independent Company.

VALLEY FALLS, KAS.—The Valley Falls Telephone Company is extending its lines to Boyle, and establishing better connections with Winchester, Nortonville and Dunavant.

HEMLOCK, MICH.—The lines of the Union Telephone Company are being extended in Hemlock.

HENDERSON, MINN.—The Henderson Telephone Company, Henderson, Minn., is extending its system.

ROCKVILLE, MINN.—The Rockville Road Rural Telephone Company has extended its lines to within ten miles of St. Cloud. Further extensions in the company's lines will be made later.

ST. PETER, MINN.—The Cannon Valley Telephone Company expects to establish headquarters in Waterville, and will erect an exchange and office building in that city.

BOWLING GREEN, MO.—Fifteen thousand feet of cable is to be installed by the Buffum Telephone Co.

HAMILTON, MO.—The Hamilton Home Telephone Company, Hamilton, Mo., expects to string over a mile of cable.

LIVINGSTON, MONT.—The Livingston Home Telephone Company has commenced some new construction work.

ORD, NEB.—The Farmers' Telephone Company has commenced the construction of its system in Ord.

ELY, NEV.—The exchange at Ely, Nev., has been enlarged, and a line to Ogden, Utah, is contemplated.

SALISBURY, N. H.—The Kearsarge Telephone Company is rebuilding its lines at Salisbury, N. H.

PENN YAN, N. Y.—Among the other improvements which are to be made by the Inter-Ocean Telephone Company at Penn Yan is the laying of considerable underground cable, which will be connected with the aerial cable.

TICONDEROGA, N. Y.—The Ticonderoga Telephone Company, of Ticonderoga, will extend its lines and include the villages of Ticonderoga, Addison Junction, Rogers Rock Hotel, Streetroad, Crown Point, Port Henry, Chilson, Schroon Lake, Whitehall, Hague, Bolton, Caldwell, Glens Falls and Putnam.

YATES, N. Y.—The lines of the Lakeside Telephone Company are being extended north and west of Yates, covering all the unoccupied territory between the Ridge Road and the town line of Ridgeway and Yates.

LANSFORD, N. D.—Among the many improvements planned by the Northern Telephone Company, of Lansford, N. D., is the installation of a new exchange at that point. The work of setting the company's poles has already commenced.

MINOT, N. D.—The telephone lines of the Minot Light and Telephone Company are being extended.

KUTZTOWN, PA.—The Rural Telephone and Telegraph Company, which has recently completed a line from Kutztown to Kempton, is to still further extend its lines beyond Kempton, and will probably eventually connect with Grimsville, New Smithville and Claussville.

MEMPHIS, TENN.—Among the questions to be considered by the advisory committee of the St. Francis Levee Board is the proposition to build a telephone line along the levee from Memphis to Walnut Bend.

ALVORD, TEX.—The Independent Telephone Company, of Alvord, has recently constructed a line connecting Alvord with Decatur, putting the Alvord subscribers in close touch with the southern part of the county.

MONTPELIER, VT.—The Orange County Telephone Company is planning to extend its lines from Barre and Northfield into Montpelier. It already enters the city from Plainfield and other towns in that direction, connections being secured with Barre in a roundabout way. The company has a number of subscribers in Barre and Northfield who want Montpelier connections, and if it receives permission to enter the city by another line than that which it now occupies it will probably build by way of Berlin. Should the company make this connection it will bring it into direct competition with the New England Company.

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Independent Service Awarded First Prize at Minnesota State Fair

By Chas. H. Coar.

DURING the early fall of each year one of the important attractions of the Twin Cities is the Minnesota State Fair, which has long since attained national importance in the United States. Each year of its existence additions have been made until its scope now covers nearly every branch of manufacturing, commercial and scientific pursuit.

The livestock exhibitions especially have grown in the past few years to such proportions that a new amphitheater for judging stock in has been constructed at a cost of $100,000. This building is considered the best of its kind in the United States. The Fair Grounds is situated near the northern boundary line between Minneapolis and St. Paul and covers an area of 200 acres well selected in view of being adaptable for the many purposes served by a Fair of this description. The Fair lasted a week this year, starting September 3, and the total attendence for the six days its gates were open to the public was approximately 302,000 people as recorded by the turnstile counters.

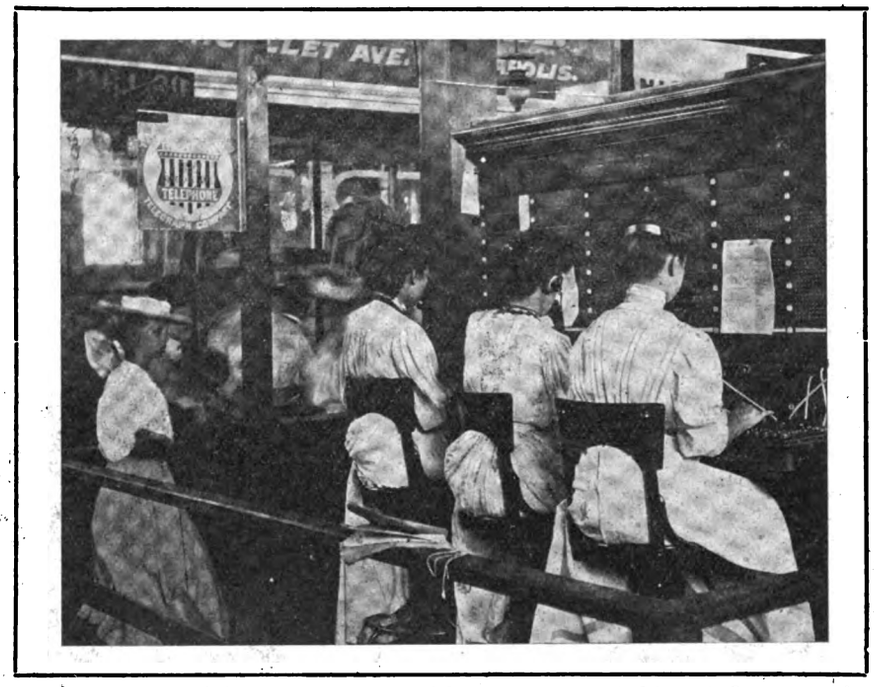

Fig. 1. Exhibition switchboard set up by the Tri-State Telephone and Telegraph Company at the Minnesota State Fair.

Among the many excellent exhibitions, the example exchange installed by the Tri-State Telephone and Telegraph Company was well in the foreground, and it not only attracted considerable attention as an exhibit, but also rendered very efficient service to the public at large as well as to the Fair management. The exchange as installed was admirably located on the principal passage way in the main building and comprised the following equipment: The switchboard was composed of three positions of the latest type of Stromberg-Carlson central energy apparatus, this being designed as an addition in a regular exchange of the Tri-State company. This board, a front view of which is shown in Fig. 1, is finished in mahogany and has equipment for two local positions and a trunking position. A three-wire line circuit is used in the board.

Connections are provided for 30 subscriber's lines, 24 outgoing and 14 incoming trunks, these latter being distributed to the various exchanges in the Twin Cities. The lines were multipled throughout the three positions on the board to facilitate operating and each local position was equipped with 40 answering jacks. The operator's equipment comprised the regulation breast transmitters and head receivers, terminating in double plugs adapted to fit jacks located in the key shelves at the different positions as is the customary practice at present. The rear of the switchboard was left entirely open in such manner that the visitors would have a ready view of the parts entering into its assembly. This brought out the features of the cabling, the mounting arrangement, and also furnished some means of enabling the uninitiated to obtain a fair knowledge as to what a complex piece of apparatus a telephone switchboard is. This idea proved to be of much importance as a drawing card as will be readily understood by reference to the photograph reproduced in Fig. 2, which illustrates the points involved.

The power was obtained from two sets of storage cells of 20 cells each, one set having a capacity of 120 ampere hours, being used as the main battery, the other having a capacity of 36 ampere hours which was used only as an emergency battery. These batteries were mounted in regular form and placed in a closet where they were free from any interference. The charging and discharging was effected through a regular power panel as shown in Fig. 3. This panel was equipped with the customary meters, circuit breakers and switches. In addition to this equipment the line relays of the subscriber's circuits were mounted at the bottom of the panel in substitute for the regular intermediate rack otherwise used. The storage cells were charged from a 110 volt lighting circuit through a bank of 15 incandescent lamps placed in multiple for resistance and as a means for properly proportioning the current to the storage cells. The 110 volt service

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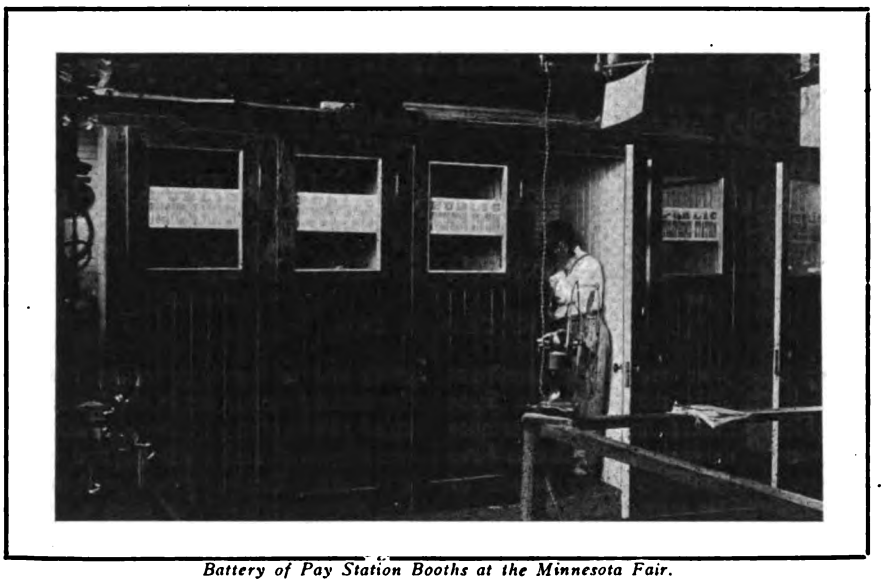
was furnished by the Fairbanks-Morse Company from one of its gasoline engine generator exhibits. A Cook rack provided with No. 8 self-soldering heat coils and carbon arresters, equipped for the required number of lines was installed in close proximity to the power board as is shown in Fig. 3. Approved jumper wire was used to connect the lines from the terminal rack to the intermediate bay which was mounted so as to become a part of the power panel.

From the terminal rack cables are used for distribution purposes in the Fair Grounds. A 100 pair dry core cable is used for local distribution, this cable being distributed by smaller cable taps in such a manner as to reach out to a natural number of distribution points or centers in the Fair Grounds where terminal cans were erected. A 50 pair dry core cable also extended from the terminal rack to the Park exchange of the telephone company, located approximately 5 miles south of the Fair Grounds. This cable was used mostly for trunk circuits to this and other regular exchanges of the company and also provided circuits for a number of telephones located in the Fair Grounds which were connected directly to a regular exchange. There was also used for distribution purposes on the Fair Grounds about 25 miles of open circuit composed mostly of No. 12 E. B. B. iron wire placed on a standard city lead. There were approximately 116 telephones installed in the Fair Grounds, 30 being located in the various offices of the State Fair Association. These telephones were used for business pertaining strictly to the Fair. A total of 68 stations were connected as regular subscriber's stations on the switchboard on a weekly rental basis.

These telephones were installed among the different stock owners and exhibitors in general. In addition to this number of telephones 18 pay stations were installed at different points in the Fair Grounds.



Battery of Pay Station Booths at the Minnesota Fair.

The whereabouts of the pay stations was made easily discernible owing to the intelligent use of a large number of advertising shields.

These shields were done in colored enamel upon an iron background in the design representative of the Independent telephone service throughout the United States. The pay stations were all provided with Gray coin apparatus equipped to operate with three sizes of money, 5, 10 and 25 cent pieces respectively. Seven of the pay station booths were located in the exhibit space near the switchboard as shown in an illustration.

Here attendants were on hand at all times to put through any calls or explain the apparatus to strangers and the booths shown proved to be both remunerative and convenient.

(*Continued on page 206.*)

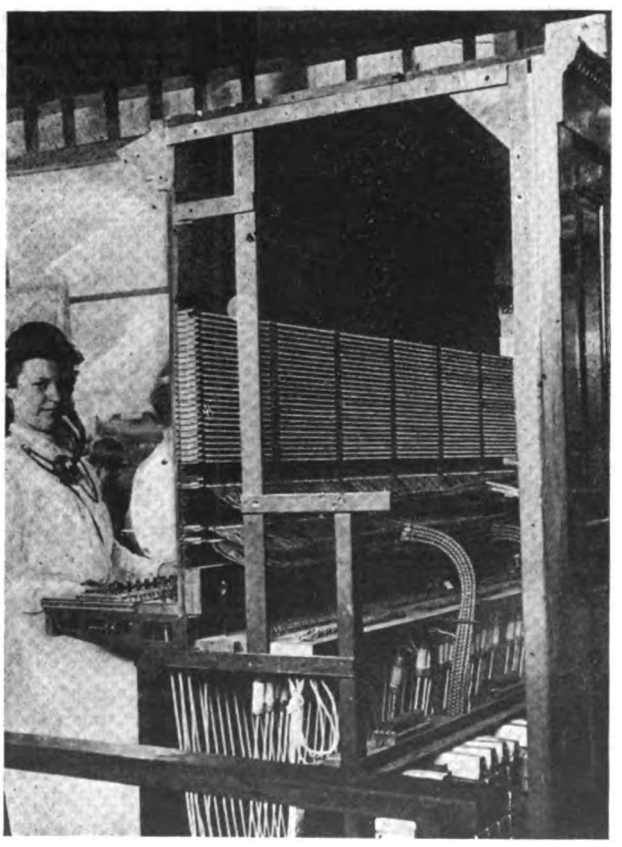


Fig. 2. View of the switchboard, left open for inspection of visitors.

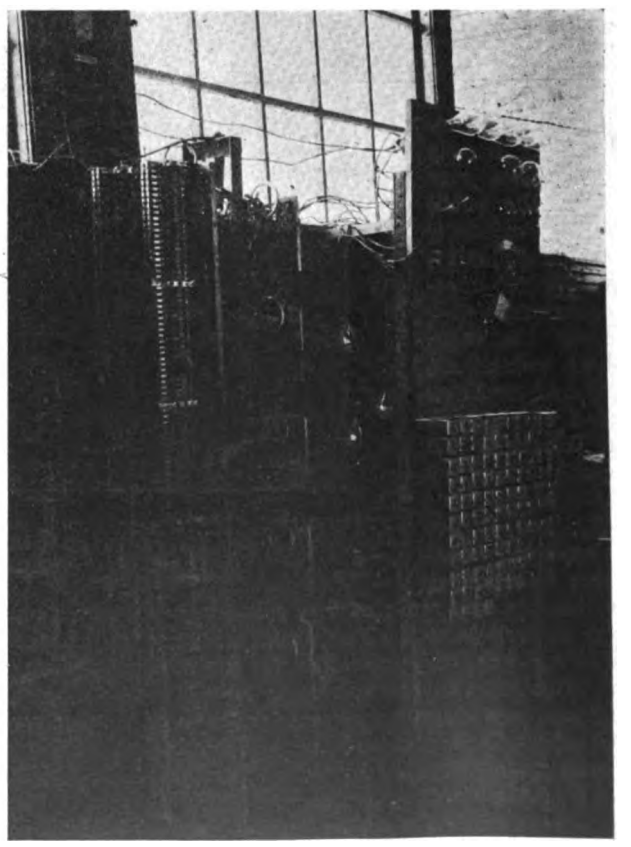


Fig. 3. Arrangement of power and terminal apparatus, fully exposed to view.

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Condenser Testing

By C. D. Enochs.

THE matter of the proper method for testing the capacity of condensers has been discussed by numerous engineers, and we find good authorities upholding the charge method, the discharge method, and what is known as the alternating current method. While there is a difference of authorities as to the best method for testing condensers in most fields of work, yet if the field in which the condenser is used is restricted entirely to telephony, there probably will be no dissenting voice to the statement that the alternating current method is the one that should be employed. Inasmuch as the condenser is only used with alternating currents, this in itself would seem to indicate that tests of capacity should be made with alternating currents.

It is possible, by using an accurate charging and discharging device, to arrange a discharge method which will closely simulate the effects obtained by the use of the alternating current method. However, as the alternating current method is much simpler, and as there are less opportunities for personal error, as well as less chances of the apparatus being out of adjustment, it appears as if the alternating current method should be given the preference, unless some valid reason can be brought forward to show some point of superiority of the discharge method.

If a condenser is charged from a given source of potential for a definite length of time, and then is discharged through a galvanometer, a certain deflection is noticed. If this deflection is compared with that obtained by charging a standard condenser with the same source of potential, and discharging through the galvanometer, a direct ratio obtains between the deflection and

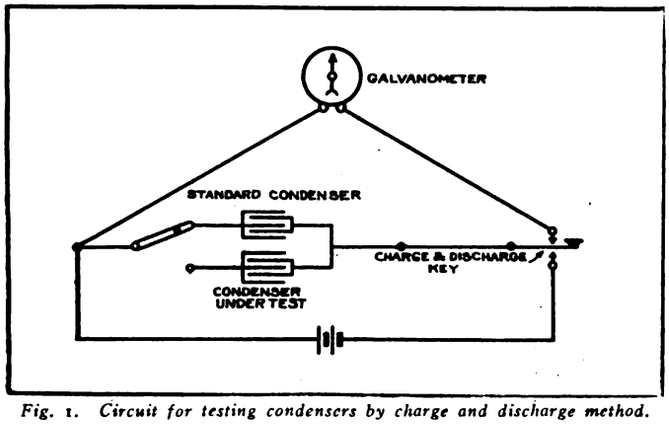

Fig. 1. Circuit for testing condensers by charge and discharge method.

the capacity of the condensers. If the condensers to be tested were all of high grade mica type this discharge method would give a measure of the true capacity of the condensers.

In the case of a paraffine condenser, however, we have several other factors entering. In the first place, there is a certain amount of moisture present in the paraffine. Secondly, the paraffine has a faculty of absorbing a certain amount of the discharge, aside from what might be stated to gather on the tin foil at the instant the condenser is discharged.

If a paraffine condenser is charged for a fractional part of a second, and discharged through a galvanometer, and the same condenser is again charged from the same source of potential for one minute, and discharged through the galvanometer, the second deflection will be found to be greater, in some cases several times as great, as was the first. A series of such observations would enable us to establish a curve, showing the relations between the apparent capacity of the condenser, and the length of charge. Although such a curve and such an investigation would be interesting from a technical point of view, it is not the purpose of this article to go more deeply than is required for the practical man to obtain a knowledge as to how he should test the condensers used in his telephones.

The fact that condensers show different capacities when charged for different lengths of time makes us skeptical at the outstart as to their true capacity. We know that a condenser that we purchase with a mark of 2M-F on the cover, will give us a deflection corresponding to a 2 M-F condenser, if charged for one minute, and then discharged. When we discover that

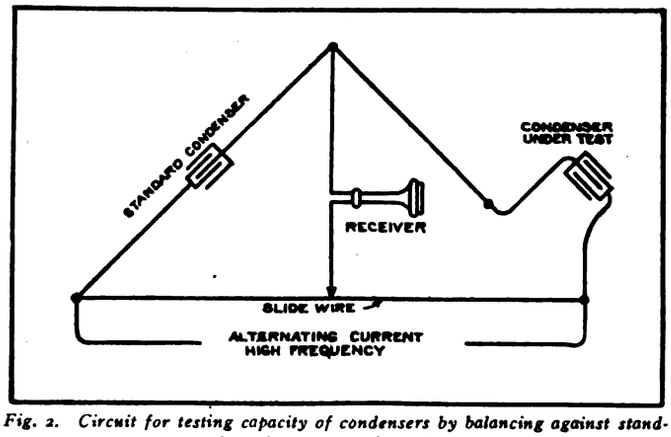

Fig. 2. Circuit for testing capacity of condensers by balancing against standard condensers in bridge circuit.

this condenser will show only a capacity of 1½ M-F when charged for one-half second, we wonder what capacity it would show if charged for .001 of a second. In other words, we doubt whether or not this condenser is 2 M-F capacity when used in circuit with an alternating current of 1,000 cycles. It will appear to the practical man immediately that a test of this condenser made with an alternating current of 1,000 cycles will give him a more reliable basis for judging its capacity when used in his telephones.

Such a test can be easily made, as illustrated in Fig. 2. This is merely a slide wire bridge arrangement, with the battery replaced by a source of high frequency current, a standard condenser used as one arm, and the condenser under test used as the second arm of the bridge. It will be a difficult proposition for the average telephone man to obtain a frequency of 1000 alternations per second, although he can approximate it by having a person sing in a telephone, taking the alternating current produced by the induction coil as his high frequency. Before taking this step, however, we should inquire as to whether or not there is a point between a frequency of 1,000 per second and the 10

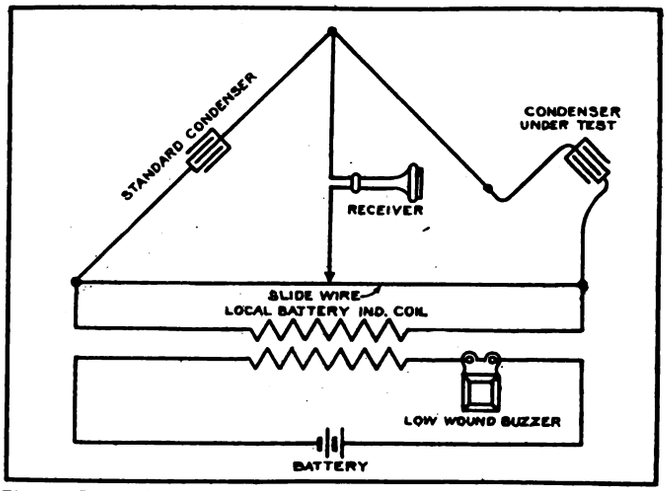

Fig. 3. Practical arrangement for obtaining alternating current and testing condenser by slide wire bridge.

per second used in the discharge method, which will also show the true capacity of the condenser. It would seem plausible to suspect that there should be such a point.

If the paraffine is absorbing the current in the discharge method, and giving it back to the galvanometer in a greater proportion than it can in the alternating current method, there

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must be some frequency above which the condenser will not absorb the current, and below which it will absorb the current. By laboratory tests, it has been found that with a frequency of 100 cycles, we are absolutely free from the absorption effect in a paraffine condenser. It is an easy matter to arrange a source of alternating current of 100 cycles or more, and the same results will, of course, be obtained, whether the frequency is 100 or 1,000, as long as we are certain the absorption has been eliminated.

A circuit such as shown in Fig. 3 gives us a device for obtaining this current which is within the reach of all telephone men. An ordinary local battery induction coil is taken as a transformer, the primary is connected in series with a buzzer and several dry batteries, the secondary being carried to the bridge. With this piece of apparatus at hand, some interesting results can be obtained in testing condensers of various makes.

After testing a number of both large and small condensers, it will become apparent that it is seemingly impossible to build a condenser of full 2 F-M inside a certain limit of dimension. The smaller condensers placed on the market as 2 M-F, will undoubtedly test 2 M-F on a discharge method. Hence, the manufacturer is justified in calling it a 2 M-F condenser, and in many cases does not realize that the condenser is really considerably less in practical use.

The smaller types of condensers that measure 2 M-F on a discharge method, will be found to run often below 1 M-F on an alternating current method. This means, unquestionably, that the smaller size condensers that are often placed in common battery telephones are not 2 M-F capacity, as far as the operation of that telephone is concerned. This can be readily verified by any exchange manager, with the apparatus at his command.

The final question is, Will a telephone equipped with one of this type of condensers, transmit as well as if it were equipped with a condenser measuring 2 microfarads to alternating currents? As an example, we will take the well known Bell condenser transmission circuit, used in most of their common battery telephones. This circuit depends greatly upon the condenser for its transmission efficiency. It is evident that the condenser C is charged by the potential across the transmitter D. When the transmitter lowers its resistance, the potential across its terminals is, of course, lessened. The condenser will then discharge through the winding of the induction coil B, where the current induces a corresponding current in the winding A, which is sent out over the line, thus assisting in the transmission

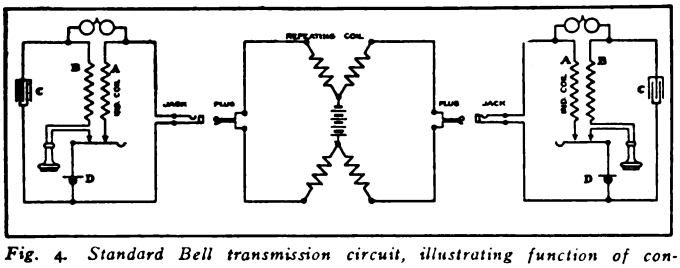

Fig. 4. Standard Bell transmission circuit, illustrating function of condensers.

produced by the variation of the line circuit, by means of the change in resistance of the transmitter D. It is evident that if this condenser does not contain a certain amount of current stored up, it will not be able to assist the transmitter appreciably by its discharge. It is found that with the Bell circuit, a 2 M-F condenser will give as good transmission as anything above that figure. In other words, with the pressure across the condenser given it by the potential across the transmitter, only a certain amount of current can be forced through the winding B of the induction coil. If the condenser is 4 M-F capacity, it will absorb more current, but it cannot discharge it through the coil in the transmission circuit to any better advantage than can a 2 M-F condenser. When we take a condenser of less than 2 M-F capacity, the result is different. We find that there is a point beyond which, if we reduce the capacity of the condensers, the efficiency of transmission of the circuit is impaired.

The curve with various capacity condensers is approximately as shown in Fig. 5. It is seen on this curve that at the point 1.5, we have practically reach a maximum efficiency, but that below this figure, a slight lessening of the capacity of the condenser materially effects the transmission of the circuit. It is also noticed that between 1½ and 2 M-F capacity condensers, there is

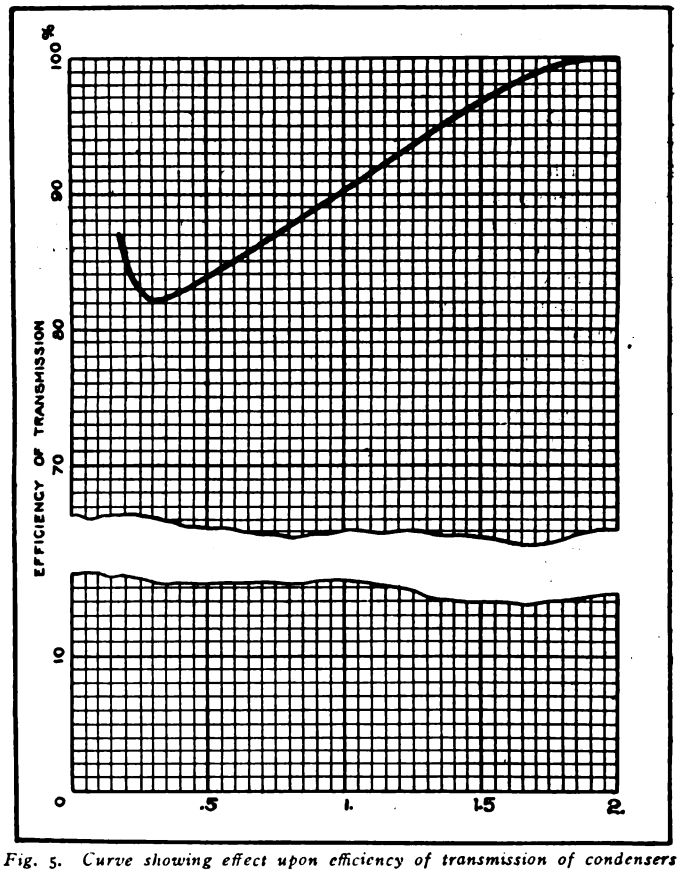

Fig. 5. Curve showing effect upon efficiency of transmission of condensers of various capacities.

very little difference in transmission, and that above 2 M-F, the curve is a straight line. The same effect is found in the Independent circuits that use a condenser to assist transmission, although the curve, of course, will vary with different types of circuits.

The conclusion as to the capacity of condensers then is that in Bell circuits, at least, condensers should never be used below 1½ capacity, and that it is preferable they should measure 2 M-F capacity, and that these measurements must be made with an alternating current method. It might be stated also that in all of the Independent types of circuits that the writer has tested, the capacity should never be below 2 M-F As we find by experiment, that there are no commercial condensers below a certain outside dimension that will measure a full 2 M-F capacity, it is well at the outset to demand the large type condensers when you are purchasing condensers to be used with common battery telephones. It is, of course, only fair to state that the manufacturer must, necessarily, charge more for these large condensers, and that the smaller condenser has really been the outgrowth of the demand of the consumer for a cheaper condenser. The point at issue seems to be that the condenser should be made any size that consumers desire, but that they should be stamped with the true capacity, as tested by an alternating current method, and not as tested by a discharge method.

The insulation resistance of a condenser in practice is not of so much importance as is the capacity. It is possible to make a good condenser with a low insulation resistance, although this is not usually the case, in a commercial product. Ordinarily, a condenser having low insulation resistance will be of the type that shows a high capacity on a discharge method, and a low capacity on an alternating current method. The cause is moisture in the paraffine, or in the paper composing the condenser. One well known manufacturing company has a standard of 500

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megohms insulation resistance for their large condensers, and an insulation resistance of 2 megohms for their smaller condensers. We would expect from this statement that their large condensers would test the same for both discharge and alternating current methods, and that smaller condensers would test high with a discharge method, and low with an alternating current method. This is exactly the condition that is found with the product of this manufacturing company.

If the capacity of a condenser is up to standard, the only reason for inquiry as to the insulation resistance is to keep down the battery leak from the central office. An insulation resistance of even 2 or 3 megohms will make a negligible battery leak for even a large exchange. So, we might say that any condenser measuring full capacity with an alternating current test, with anything over 2 or 3 megohms insulation resistance, is a satisfactory product.

The break-down strain of a condenser does not necessarily bear any relation to its insulation resistance, although this would not be apparent at first glance. A low break-down point in a condenser may be due to thin paper, or to paper of poor quality, and the condenser might show a very high insulation resistance. On the other hand, if thick paper were used, so that the space between the tin foil was large, the break-down strain would be likely to be high, while the insulation might yet be low.

To sum up, we would state that for a good commercial product of paraffine condensers, we would expect a capacity measuring fully to the mark of 2 M-F placed upon it by the manufacturer when the condenser was tested with an alternating current method. We would expect at least 2 megohms insulation resistance and, if the condenser is well made throughout would be more liable to find at least 100 megohms. We would insist upon a break-down test of at least 300 volts direct current. With these three points fully taken care of, we would have a condenser that would stand up under practical conditions, that would prevent any appreciable battery leak, and that would give us the highest efficiency in transmission in any of the common battery circuits using a condenser to increase the transmission efficiency of the circuit.

The Pennsylvania Convention

THE third annual convention of the Pennsylvania State Independent Telephone Association held at Allentown, Pa., on August 11th and 12th was characterized by the enthusiasm which distinguishes Independent gatherings in every part of the country.

The delegates were welcomed by Dr. C. D. Schaeffer, acting mayor, in an appropriate address. The response was made by Senator Kline, who gave a short history of the Independent movement. He said in part: "There was a time in my life when I viewed the telephone and telegraph as natural monopolies, but observation and the experience of the past few years has thoroughly convinced me that competition along these lines is just as necessary as along any other industrial lines. Competition puts each competitor on its mettle and the public are the beneficiaries. A monopoly can afford to be arrogant, but competition kills arrogance."

Next came the reports of officers. The annual report of President Kline came first and then followed the reports of Secretary H. E. Bradley of Philadelphia and Treasurer C. E. Wilson of Philadelphia. This Committee on Organization and Nominations was named: Chas. West, Allentown; C. E. Wilson, Philadelphia; G. B. Rudy, York; Dr. Frank Hart, Pittsburg, and E. D. Schade, Johnstown.

Treasurer Wilson spoke on the subject of getting the smaller telephone companies throughout the State to join the association.

In the afternoon Charles Russell of Philadelphia spoke on "The construction and operation of small exchanges," and E. D. Schade of Johnstown on "How to provide for reconstruction and create a market for securities." There was a general discussion of each paper.

The final business session of the convention was opened at 1.30 of the second day when A. J. Ulrich, of Philadelphia, read a paper on operating methods.

The following officers were elected: President, Charles West; First Vice-President, E. D. Schade, of Johnstown; Second Vice-President, J. G. Splane, of Pittsburg; Treasurer, C. E. Wilson, of Philadelphia; Secretary, H. E. Bradley, Philadelphia. Executive Committee—C. W. Kline, Hazleton; C. E. Wilson, Edward Davis, Philadelphia; E. D. Schade, Johnstown; R. E. Umbel, Uniontown; W. B. Trask, Erie; G. B. Rudy, York; W. H. Delinger, Patton.

Senator Kline was elected a member of the Executive Committee to take the place of Mr. West, who now becomes an ex-officio member. A meeting of this committee will be called at an early day and to it was voted the power to name the delegates of the association to the national convention and to select a place of meeting for next year.

The by-laws and constitution, revised to conform with the national laws adopted at Chicago last year, were adopted.

After the session the visiting telephone men were taken on a tour of the city in a large automobile.

The banquet held at the close of the convention was particularly enjoyable. Among the speakers were Governor William M. Budd, Philadelphia, Edward A. Solchac and others.

MANUFACTURERS PRESENT AT ALLENTOWN CONVENTION.

CONSIDERING that Allentown is really out of the telephone manufacturing center, there was a surprisingly good attendance of "the buyers," meaning by "the buyers," the representatives of telephone manufacturers and dealers. The manufacturers "buy" at conventions; in fact, it seems necessary to "buy" in order to sell. Anyway, either the Pennsylvania Independents place good orders, or manufacturers' representatives were "tipped-off" that Allentown is a bright little place, where it's possible to have a good time. Among those present were:

Oliver L. Turgeon, Eastern Carbon Works, Jersey City, N. J.; W. T. Thomas, general manager, H. C. Roberts Electric Supply Co., Philadelphia, Pa.; W. J. Mooney, Carbon Telephone Mfg. Co., Pittsburgh, Pa.; S. C. Platt, Frank B. Cook, Chicago, Ill., with a line of samples of Cook's well-known products; Arthur B. Weil, H. C. Roberts Electrical Supply Co., Philadelphia, Pa.; John F. Calef, Philadelphia, exhibiting the Pike Adding Machine, manufactured in Orange, N. J.; F. C. Park, National Carbon Co., Cleveland, O.; Samuel S. Warner, Standard Underground Cable Co., Philadelphia; J. H. W. Rees, Kline Chair Co., Trenton, N. J.; J. W. Hayes, Rumsey Elect. Mfg. Co., Philadelphia; P. C. Burns, American Electric Telephone Co., Chicago. The American Electric company distributed a nickel-plated souvenir paper-weight, in the shape of its standard receiver in miniature.

Evan S. Shelby, the popular sales manager of the Sterling Electric Co., Lafayette, Ind., had an attractive exhibit of standard Sterling telephones, switchboard and telephone parts, pole terminals, protectors, etc. This exhibit was in the lobby of the Hotel Allen, which is just at present being remodeled. The rough plaster and lath of the unfinished interior made quite an effective background. Each delegate found a card on his table in the dining room on Tuesday inviting him to register in the Sterling book, for a souvenir; and not being entirely satisfied that everybody's name was in the book Mr. Shelby's active brain conceived the idea of repeating the invitation on the lunch card of the hotel on Wednesday. The Sumter Telephone Manufacturing Co., Sumter, S. C., exhibited also in the Hotel Allen,

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being represented by one of its engineers. Very favorable comment was heard on all sides about the new "Unitype" switchboard, the drops in which can be withdrawn one at a time without the use of any tool. The company, which manufactures magneto equipment exclusively, also showed its standard line of telephones and parts, and particularly its new receiver, which is made only with a hard rubber shell. This company pays particular attention to manufacturing heavy duty telephones.

J. W. King, of Rochester, and H. A. Jones, of Philadelphia, represented the Stromberg-Carlson Telephone Mfg. Co., and had a very comprehensive exhibit of telephones, switchboards and supplies. The exhibit was located in a room just off from the lobby and was a representative display of the products of the Stromberg company.

Leeds & Northrup, 4901 Stenton avenue, Philadelphia, exhibited a line of testing and measuring instruments used in modern telephone practice. The company was represented by Julius Bernstein, of Philadelphia. Among other interesting instruments were the Fisher Cable Testing Set, the Decade Portable Testing Set, the Portable Testing Set No. 1, and the L. & N. Portable D'Arsonval Galvanometer.

The Automatic Electric Company of Chicago, represented by C. L. Fisher and F. F. Caldwell, had an exhibit in the hotel of automatic telephone apparatus. Its principal exhibit, however, was the Allentown exchange, which is equipped with automatic apparatus, and was inspected by the delegates.

INDEPENDENT SERVICE AWARDED FIRST PRIZE AT MINNESOTA STATE FAIR.

(*Continued from page 202.*)

The installation thus briefly described was awarded the first prize and has undoubtedly done a great deal to further the Independent movement in the northwest. The idea of so placing telephone apparatus as to attract the attention of the eye in addition to being useful combines to form a strong combination which can be adopted by Independent companies in general to good advantage. It is very unlikely that a State Fair will ever exist which will not warrant such an installation and the advertising power thus obtained is alone well worth the money or expense incurred in placing the installation.

However it so happens that the rentals will figure up to a good sum and it is not unusual that the same exhibit space can be obtained by a contract covering a period of several years by offering free service to the Fair association during the week of the Fair. If this arrangement can be accomplished the installation becomes semi-permanent and thus increases its value to a greater extent. It may be appropriately mentioned for humanity's sake that this installation rendered very effective the able work of the Red Cross Society, which offered and furnished relief to the unfortunately stricken visitors to the Fair.

The Red Cross Society was provided with a large number of automobiles which were placed in charge of physicians and trained nurses ready to do duty at the summons of the telephones

Exhibits of Prominent Manufacturers at the Allentown Convention.

R. Davis represented the Dean Electric Company of Elyria, Ohio, with samples of common battery and magneto telephones, switchboard parts, ringers, etc. The Dean harmonic selective party line ringing system, of course, attracted much attention, Mr. Davis demonstrating the working principle to a large number of interested delegates.

E. D. Dorsey, of Philadelphia, district manager of the Addressograph Co., Chicago, had a working exhibit of this addressing system in the hotel lobby, and demonstrated the ease with which telephone companies may address envelopes, make out subscribers' bills, make up pay rolls, fill in subscribers' names in lease ledger, etc., on his machine. The work can be done by an office boy at the rate of 3,000 names per hour.

placed about the Fair for this purpose. The week of the Fair caused a considerable increase in the operating loads of the regular Twin City exchanges of the company.

OAKLAND, CALIFORNIA, TO HAVE MODERN TELEPHONE BUILDING ERECTED BY HOME COMPANY.

THE new exchange building which is being erected for the Home Telephone Company of Oakland, Cal., is remarkable not only for the modern methods employed in its construction but also for its attractive appearance.

The structure will cost about $60,000. It comprises three stories and a high basement and will be constructed of reinforced concrete and steel, so as to be entirely earthquake proof.

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QUERIES

LOCATION OF BATTERIES.—(770.)

We have been much troubled with creeping of salts in our gravity batteries and they give poor service. It has been suggested to us that this is due to their being set on the (cement) floor in the basement, but as this is the most convenient place for them we do not wish to make a change until we are sure that it is necessary. B. B.

THE trouble with your batteries is probably to a large extent due to their location. In a basement, which presumably is poorly lighted, there will always be more or less moisture to condense on the glass, and its presence will cause the "creeping" you mention to proceed much more rapidly than it would do in a dry place.

In addition to the trouble due to the "creeping" effect it is probable that the moisture on the glass and cement floor forms a conducting film which produces a constant local action, and also partially shunts the transmitter circuit. This would in a measure account for the poor service.

The greatest difficulty, however, is very likely to be due to the fact that it is difficult to properly observe the condition of these cells in a dark place. It is very necessary for good work that the "blue line" should be about midway of the cell, and the batteries should be carefully watched to see that it is neither too high nor too low. We would suggest that the glass be coated with paraffine for an inch or so from the top, if this has not been done, and that the cells be mounted on a wooden stand. A light should be placed where it can be conveniently used in inspecting the cells every two or three days.

HAVE IMPEDANCE COILS POLARITY?—(771.)

Is it necessary to connect up an impedance coil in any particular way to secure proper action—that is, has it any polarity? B. W.

IT may be set down as a rule to be memorized that no solenoid having a soft iron core has any polarity. An impedance coil is almost invariably employed in telephone circuits to prevent the passage of alternating current. It will be seen that if it were polarized the effect upon the current passing in one direction would not be the same as upon the current of opposite sign, and then its object would not be properly fulfilled. An impedance coil, consisting of a coil of wire wound about a soft iron core, may have the connections to its terminals reversed without in any way influencing its effect.

NOISE FROM BUZZER IN COMMON BATTERY EXCHANGE.—(772.)

Recently we connected an ordinary low wound buzzer through a resistance on our storage battery for a special purpose. Whenever it is operated it makes all the lines noisy. We have seen such an arrangement worked in other exchanges with no unpleasant results and could appreciate it if you can help us to find a reason for our trouble. V. B. C.

TO check the cause of the noise connect a voltmeter across the leads from the battery to the buzzer a few inches from the bus bar, and operate the buzzer. If there is any vibration of the voltmeter needle while the buzzer is in operation it will show that there is produced a fluctuation in voltage, due to the variation of the C R drop through the buzzer, which is communicated to the bus bars. Any rapid variation in the difference of potential between the positive and negative bus bars in a common battery exchange will produce a noise in all the lines and operators' telephone sets.

To correct the trouble either connect your buzzer to a local battery, preferably consisting of a few dry cells, or change the point of connection to your common battery. In the latter event the buzzer leads should be carried to a point on the main battery leads so close to the storage battery terminals that there will be practically no resistance between this point and the end bus bars of the battery itself. Then the portion of the C R drop in the main leads will be negligible. This will be evident from a consideration of the fact that where R is equal to zero the product of C and R is also equal to zero.

TRANSPOSITION.—(773.)

We are very much troubled by cross talk on a pole line running out into the country for ten miles. This line is built on poles carrying circuits on two 10-pin arms part of the way and for the remainder of the distance wires are run on one 10-pin arm, with an extra circuit supported by brackets. Can you give me a transposition diagram which will help us to clear this cross talk? R. J. N.

FROM the information which you give us we cannot form a sufficient idea of the actual conditions on your line to give you any useful suggestions. It will be necessary for you to forward a complete diagram of your line, showing the layout of circuits on each ten-pin arm for the entire distance, with metallic and grounded lines clearly designated. Distances from the central office to the point where each line leaves the main pole line should be accurately determined and clearly marked on the diagram. It is well to mark not only the actual distances, but the number of poles set in this space.

If instruments are bridged across the line at any points they should be marked on the diagram, with their locations clearly shown. Upon receipt of this information it will be possible to make out a diagram showing the most effective and economical plan for making transpositions to overcome the cross-talk which annoys you.

INFORMATION DESK CIRCUIT.—(774.)

Will you please explain to me how it is that an information operator in a Bell exchange can answer a call from a subscriber and go off the line without having the connection taken? Are special instructions issued for calls of this sort? J. R. G.

IT would be impractibable and confusing to the subscribers' operators to issue special instructions for supervision on calls to the information operator. In practice this matter is arranged through the use of a "holding coil," which is cut across the line as soon as the information operator goes off of the cord provided for this purpose. This coil is simply a 500 ohm retardation coil. Its resistance is sufficiently low to permit the passage of enough current to operate the supervisory relay at

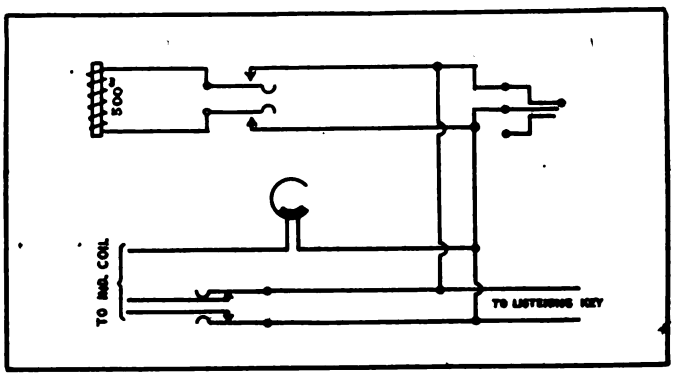

Fig. 774.

the subscriber's position, thus insuring proper signalling. At the same time this coil is so designed that it offers to alternating voice currents an impedance which prevents them from being short-circuited through it.

It will be seen from the diagram of the essential parts of this circuit shown in Fig. 774 that, even when the operator cuts out her telephone set from the special cord circuit in order that she may switch it to a local trunk by means of the regular listening keys, the retardation coil may be left across the information cord, thus holding the trunk with which it connects. This insures the continuance of the connection at the local switchboard until the subscriber has obtained all the information which the operator desires to give, as the operator will not pull down the cord until the lamp is lighted.

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THE EDITOR'S PAGE

AN EFFECT OF APPEARANCE.

A DECIDED hit with the city fathers of Rutland, Vermont, is said to have been made by the men who were seeking a franchise for a telephone system through the mere exhibition of a modern, compactly built telephone of the type made by one of our leading Independent manufacturers. A telephone contract agent has recently published, as an example of the strange things that sometimes help men in his branch of the work, a little anecdote describing his interview with an artist who had a blank space on the wall of one of his rooms. He became convinced that a telephone was the thing which would look best in this particular spot, and subscribed for the service.

These things go to show the value of following the motto "Always try to please the subscriber." When the solicitor is trying to get a contract for a residence he dwells on the value of the service, and pounds in his points on the saving of time, the social convenience, protection against fire, sickness, burglary, and all the rest. Nevertheless he always realizes that his proposition is an educational one, and as such takes time. Telephone service must be more or less known to be appreciated. The average person, partially unfamiliar with this modern necessity, frequently thinks much in the same terms as those by which he expresses himself when he speaks of "putting in a telephone." The service, of course, is the thing he is buying, but the sign of the service in his house is the instrument on the wall or table, essentially a piece of furniture. Its appearance ranks almost as high as its utility, and of the former quality he is far more fitted to be a judge than of the latter. This is one of the reasons which has led the Independent manufacturers to make the unceasing efforts which have already resulted in the production of apparatus of such compact form and attractive design from an external point of view. It is in fact, and perhaps to an extent not wholly realized, one of the important things which has contributed to the extension of the service of the Independent operating companies.

GETTING THE PEOPLE INTERESTED.

AGRICULTURAL fairs, for the next few weeks, will be the means of drawing together many thousand people in a great many sections of the country. These gatherings offer to those who have goods to sell an opportunity for reaching hundreds of people in a way that is admitted to be particularly forceful. That telephone companies may derive advantages from exhibitions of their methods and service at meetings of this character has been demonstrated through the example given by the enterprising agents of the Independent company which furnished an excellent special service to the patrons of the State Fair at Minneapolis.

The manner in which this exhibition was conducted, as will be evident from its description which appears in other pages of this issue was admirably adapted to produce the desired results. In the first place, as the service of a telephone company is the point where the supreme test is applied, and by which the character of the company is impressed upon those to whom it looks as future patrons, no pains were spared to make this adequate from all points of view. Provision of sufficient lines and instruments for the conduct of all the regular business connected with the administration of the fair, and even that due to emergencies was ample. Numerous pay stations made it possible for the general public to use the telephone whenever communication was desired. The handling of calls by skilful operators added the finishing touch to the arrangements for giving a service which would make all visitors to the fair friends and supporters of the company which furnished it.

In exhibitions of this sort, however, be they as excellent as they may, the mere furnishing of a first class service is not enough. The paramount thing to be kept in mind is its value as an advertisement of the company's work, and the exhibition must be not only of good quality, but its accessories must be striking in appearance. The object is to reach and convince every person who visits the fair that he needs a telephone, and needs some particular company's service.

Not enough people see our telephone exchanges to prevent their appearance, and the working of the apparatus, from being still very much of a novelty to the greater number of persons who visit an agricultural fair. Advantage of this fact was taken by the company at Minneapolis by installing a multiple board in such a manner that all its equipment and accessories were in plain sight. This served to give a knowledge of the intricacy of the equipment which could not fail to emphasize the general excellence of the results in the way of speed and accuracy which are secured by its use. Incidentally, to those who see in a telephone system nothing more than a box on the wall to which are attached two little wires it must have taught the fact that a telephone system is after all rather a complicated affair, which costs money to build, keep in order, and operate. Thus the value of such an exhibition may be not only far-reaching, but cover a broad field, perhaps preventing a few of the unwarranted complaints on rates from misinformed persons.

The final lesson from the Minneapolis exhibition is conveyed by the liberal use of the shield, which met the eye at every instrument, as well as at the central exhibition, and helped the people who observed it to acquire the idea that the company which used it is one of the many which are united in the aim of building up a national service with a broad principle for a foundation.

THE TARDY SCHOOL COMMITTEES.

MERIT is a thing which makes slow progress with institutions and city departments when it can be secured only through the diminution of appropriations which are always thought to be too small. Instances almost innumerable to show the value, and often the positive necessity, of having telephones in school buildings could be brought forward, and yet such installations are still comparatively rare, even in the larger city buildings. The opening of the terms this year, and the approach of winter, will probably see an extension of facilities in this direction which, when the totals for the entire country are added, will make a very large number of new installations.

Where large groups of people are brought together under one roof the possibility of sudden danger from sickness or accident is much increased, and for its protective value alone the telephone should be installed in every school. Of course there are certain petty annoyances arising from the too frequent use of such a line, but wherever telephones, or even complete branch exchange systems have been working for a reasonable length of time it seems to be the common experience that the convenience of the service far outweighs any of the trifling burdens which it may add.

When school committees fail to take the initiative it would appear to be a very good thing for the telephone companies to take up this matter. From their residence subscribers they will not lack encouragement.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

POSITION OF ABUTTING OWNER WHO CUTS POLES.

Our company has leased a line of poles that were set three years ago. One farmer, of whom no right of way had been secured by the company setting the poles, cut down our wire. Had he not forfeited his right of forcible ejectment by letting the ploes remain on the farm for a period of three years? The poles were set along the highway. G. D. C.

YOUR company would be entitled to a temporary injunction restraining the farmer from cutting your wire and interfering with your line. This would be on the ground that an injunction will be granted for the purpose of maintaining the status quo. The farmer, on the other hand, is in no position to ask the assistance of a court of equity to restrain you from replacing your cut wire as he destroyed the status quo. Post v. Hudson River Tel. Co., 78 N. Y. Supp, 576. Whether his permitting you to enter his land in the highway and expend money therein in the erection and maintenance of a line makes the license irrevokable is an undecided question. The following cases bear upon it: W. U. Tel. Co. v. Pa. Co., 68 L. R. A. 968; 129 F. 849; Readfield Telep. & Teleg. Co. v. Cyr, 49 A. 1047; Am. Tel. Jour. vol. 9, no. 15, page 233.

INJURY FROM SAGGING WIRE.

Will you please give us your opinion through your columns of the following:

We have a grounded line reaching a subscriber in a remote part of the town. Some time after this line had been erected a street car company built a trolley line under ours without the knowledge of the telephone company. Later, on account of a storm, the wire became detached from a pole next to the street car line and allowed same to sag, so it came in contact with the trolley of the street car company, and a lady passing under the telephone wire came in contact with it and received injuries and asks for damages. The telephone company got a man there as soon as possible for him to get there after they became aware of the fact that it was down. Is the party entitled to damage, and if so, from whom? P. T. CO.

THE fact that the telephone company did not have knowledge that the wire was erected at the time the accident happened would relieve it from liability. Martin v. Citizens' General Electric Co. (Ky.), 92 S. W. 547. In cases such as you state, the general rule is that the question of whether the plaintiff is entitled to damages is for the jury to determine. Burton Telephone Co. v. Gordon, Ohio Cir. Ct. Rep. 641; Friesenham v. Mich. Telep. Co., 96 N. W. 501. If the party is entitled to damages, it is the street railway company and not the telephone company that should pay them. It was the duty of the electric railway company to exercise a very high and exact measure of foresight, skill, diligence and inspection, and where such a company negligently fails to maintain guard wires between its wires and the wires of the telephone company, it becomes responsible for injuries which result from contact between the two kinds of wires, its negligence being the approximate cause of the accident. Richmond & P. Elec. Railway Co. v Rubin, 47 S. E. 834. In this case, a man sued the railway company for damages for the burning of his stock of goods. He alleged that the fire which consumed his store was caused by the defendant's agents moving the poles of a telephone company, and weakening the company's wires so that one or more of them broke, and fell upon the wires of the defendant, and carried electricity from them to the plaintiff's store, thereby setting fire to it. He also charged the railway company with being negligent in running its wires under the wires of the telephone company so close as to incur risk of contact and without erecting guard wires. The railway company's defense was that it was under no obligation to erect guard wires, and that the telephone company's wires were broken by a sleet storm so violent that the history of climatic variations afforded no reasonable warning of it. The court left the question of the company's negligence and whether the breaking of the telephone wire was caused by a storm to the jury, which brought a verdict for the plaintiff. You will see that there are many points of similarity between this case and yours. We believe that the railway company in your case is liable just as the railway company in the case cited.

DAMAGES FOR SUFFERING BETWEEN TIME OF INJURY AND DEATH.

IN Madison County, Miss., Mrs. Fanny Anderson brought suit against the Cumberland Telephone & Telegraph Company for damages for the death of her son and recovered a judgment. The question arose whether the plaintiff could recover, not only the value of the services of the minor child until majority, but also such damages as the jury might award for the physical and mental suffering endured by the child between the injury and death, and the court held that such damages might be recovered, however short the time might be. It was also decided that the plaintiff might recover such gratuities as the evidence would show the parent had a reasonable expectation of receiving before or after the child's majority, and such sum as the son might have recovered as the present value of his own expectancy. In determining what gratuities the parent might reasonably expect from the child had he lived, the court held that evidence that she had received gratuities in the past was admissable to show that she might reasonably expect to receive in the future. Cumberland Telep. & Teleg. Co. v. Anderson, 41 S. W. 263.

CHANGES IN CONSTRUCTION WORK WITHOUT EMPLOYER'S KNOWLEDGE CANNOT BE CHARGED FOR.

AT Denver, Col., the court has made a decision in favor of the government in the suit brought against it by James R. Thorpe, over the construction of a circuit telephone line in Arizona from the Arizona dam into the Salt River dam, near Livingstone. Thorpe claimed that the government did not live up to its contract with him and refused to pay him the amount stipulated, because of certain changes in his original plans which he claimed were necessary. The court sustained the government's contentions that these changes were made without the knowledge of the Secretary of the Interior, and that according to the contract the work must be done to the satisfaction of the Secretary.

CITY OF MOLINE HAS NO RIGHT TO REPEAL FRANCHISE.

JUDGE HUMPHREYS in the United States Circuit Court at Peoria, Ill., has granted a temporary injunction against the city of Moline, in the suit brought by the Central Union Telephone Company. The company petitioned for a writ some months ago, on the ground that the city was preventing the company from installing its service in its new building. The matter was argued, and the case taken under advisement.

In effect the decision is that the city council had no right to repeal the franchise under which the company operates. In other words, the Central Union has a perpetual franchise under the grant upon which it has the use of streets and alleys.

After the petition in Peoria had been filed, the city began a quo warranto suit in the circuit court at Rock Island, to compel the company to show its authority to do business in Moline. The writ granted restrains the city from interfering with the company's employees in the installation of the new service.

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IN THE OPERATING FIELD

BELL COMPANY DECIDES THAT THE RIGHT TO MONOPOLY OF THE TELEPHONE BUSINESS IN OMAHA IS WORTH MONEY.

AFTER long consideration, the Nebraska Telephone Company, which has so vigorously opposed the entrance of an Independent company into Omaha, has apparently determined that it is either right or necessary that it should pay a certain amount for the privilege of rendering an exclusive telephone service. Within a few days it has offered to the Aldermen, in consideration of the refusal to grant a franchise to the Independent company, that it will abolish the toll charges between Omaha and South Omaha, provided customers in South Omaha will pay the same rate for telephones as that paid by Omaha users, and that it will allow a 50 cent rebate on business telephones. A substitute for the first offer is allowed in the shape of a $1 rebate on business telephones; and a third proposition was presented to the effect that the company will pay the city of Omaha two per cent. on the company's gross receipts, which the officers guarantee will not be less than $10,000 per year. The Nebraska company thus puts itself in line with the other benevolent corporations, which are willing to pay the people for the privilege of benefitting them by exercising their constant care for the convenience of customers under the protection of an exclusive franchise.

RUTLAND, VERMONT, GRANTS FRANCHISE TO INDEPENDENT TELEPHONE COMPANY.

ON September 19th the Aldermen of Rutland, Vt., granted to the Home Telephone Company of Albany, N. Y., a franchise to locate and operate an Independent telephone exchange in the city. This decision was reached at a public meeting at which all the citizens who wished to do so were allowed to express their views on the question of telephone competition. It was found that the principal opposition to granting the franchise came from the Bell company operating in the city, but this was not sufficiently strong to overcome the arguments of those in favor of an Independent franchise.

One of the strong points made by the Independent telephone company was scored by the exhibition of modern telephone instruments, which in comparison with the cumbersome types now in use in most of the houses of the city furnished a distinct demonstration of one of the important advantages to be secured by the introduction of Independent service.

TWENTY-FIVE PER CENT. ANNUAL INCREASE IN TELEPHONES REPORTED BY INDIANA COMPANY.

THE growth in the number of subscribers of the Citizens' Telephone Company of Decatur, Ind., has been very large during the past year. At the last meeting the directors reported to the stockholders that in Decatur there had been an increase of 162 instruments during the year, making a total of 641 telephones; while at Berne the percentage of growth has been nearly as great, 90 instruments having been added, bringing the total number of telephones up to 245.

Financial reports showed that the total investment in exchanges and toll lines is now $66,000. This represents the development from a little plant, which started a few years ago with only 40 instruments. One reason for the very good showing is the fact that the plant is almost entirely owned and controlled by home capitalists who are also responsible for its operation. The management among other details introduced in the course of carrying on its business has arranged a toll rate of 10 cents to every part of Adams county, which enables patrons of the company to reach more than 1,500 telephones at various distances from their town at this very low rate and is thoroughly appreciated and commended by them. The directors chosen at the last annual meeting were J. S. Bowers, F. M. Schirmeyer, E. X. Ehringer, Dr. D. D. Clark and Godfrey Christen.

EXPANSION OF THE PEOPLE'S TELEPHONE COMPANY AT BUTLER, PENNSYLVANIA.

AT the annual meeting recently held by the stockholders of the People's Telephone Company of Butler, Pa., reports of the growth of the company's business were read, its future prospects discussed, and a large number of improvements were determined upon. The net earnings of the company for the past year were said to be about $8,000.

The rate of growth of the subscribers is said to be sufficiently high, in connection with this good financial showing, to warrant the purchasing and remodeling of a building for a new central office. A contract for a new switchboard has already been let, and, as soon as the work contemplated is completed, the company expects to be in a position to offer a thoroughly up-to-date service to its subscribers. Nearly every section of Butler county is now reached by the lines of the company, and the development in the rural sections is very strong. Subscribers for the company's service, however, are not restricted to conversation over local lines, as connection with the long distance wires of the Pittsburgh & Allegheny Company make it possible to reach almost any point with which they may wish to talk. The election at the last meeting resulted in the choice of the following directors: A. L. Reiber, Thomas J. Shufflin, J. V. Ritts, M. Henshaw and J. H. Troutman.

CONTINUED RAPID DEVELOPMENT OF TERRITORY COVERED BY PEOPLE'S RURAL TELEPHONE CO. OF SWEDESBORO, N. J., SHOWN BY LATEST DIRECTORY.

FURTHER evidence of the remarkable growth which is being made by the Independent telephone companies in New Jersey is given by the latest issue of the directory of the People's Rural Telephone Company of Swedesboro, N. J. It has always been the aim of this company to give the best service to its rural subscribers and it has received hearty support from the farmers who are connected to its line. The growth of the toll business has been particularlyly rapid and the subscribers are able to talk to a great many places in New Jersey and adjacent states. Among these are Allentown, Pa., Egg Harbor City, N. J., Swedesboro, N. J., Wilkes-Barre, Pa., York, Pa., as well as Wilmington, Del., and Harper's Ferry, W. Va. Connection can also be had with other places too numerous to mention.

PROGRESS OF THE HOME TELEPHONE COMPANY IN BUILDING THE INDEPENDENT SYSTEM OF DETROIT.

THE efforts of the Bell company to disparage the work being done by the Home Telephone Company, which is building a large Independent plant in Detroit, are considered to be very amusing by those who know the men behind the company.

The group of officers and directors engaged in this work comprises not only men who are exceedingly strong financially, but also men who are thoroughly experienced and well informed in telephone work. The business interests of Detroit also are well represented upon the board. The organization is as follows: President, Clarence M. Burton, Detroit, Mich.; First Vice-President, Max Koehler, St. Louis, Mo.; Second Vice-President, C. Marquard Forster, St. Louis, Mo.; Secretary-

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Treasurer, W. B. Woodbury, Detroit, Mich.; Assistant Secretary, C. H. Hood, Detroit, Mich. Directors—Henry Koehler, Jr., St. Louis, Mo.; Arthur Lambert, St. Louis, Mo.; C. M. Burton, Detroit, Mich.; W. W. Hannan, Detroit, Mich.; Sam. B. Jeffries, St. Louis, Mo.; T. A. E. Weadock, Detroit, Mich.; C. M. Forster, St. Louis, Mo.; W. B. Woodbury, Detroit, Mich.; A. N. Edwards, St. Louis, Mo.; Elias Michael, St. Louis, Mo. The members of the Executive Committee are C. M. Burton, chairman; W. B. Woodbury, secretary; C. Marquard Forster, Max Koehler, A. W. Lambert.

The company has purchased two tracts of land to be used as sites for its east and west telephone exchanges, and will soon begin the erection of buildings. Construction work is making rapid progress, and the consideration of the details connected with the purchase of a switchboard will be completed within a few days.

Conduit work is now being pushed along at a very rapid and satisfactory rate, in order that the outside plant may be ready by the time the central offices are installed. A recently published item in one of the Detroit newspapers called attention to the very large pay roll of the company, which has already placed it among the leading business interests of the city.

OFFICIAL BULLETIN NUMBER THREE OF THE INTERNATIONAL INDEPENDENT TELEPHONE ASSOCIATION OF AMERICA.

(SECOND SERIES.)

ASSESSMENT.

The Executive Committee has authorized an assessment of one-half of one cent per unit. Call is now being sent out.

COMMITTEE.

Acting upon the recommendation of the last committee on Standard Forms of Accounting, the President has appointed the following members of that body as a permanent committee to continue their work:

Chairman, Charles West, Allentown, Pa.; George T. Hewes, Des Moines, Ia.; W. H. Spooner, Minneapolis, Minn.; J. B. Ware, Grand Rapids, Mich.; R. E. Mattison, Lincoln, Neb.

Particular attention will be given to Standard blanks for use in connection with the methods of accounting recommended in the committee's last report. All telephone companies, particularly the larger ones, and those operating toll lines, are requested to send samples of the blank forms used in their various departments, to this office for the use of the committee, who will also be glad to hear from anyone having suggestions to offer in connection with this subject.

PRACTICAL CO-OPERATION.

Everyone interested in the success of Independent Telephony is invited to co-operate with the Association in carrying on its work.

Has your experience shown you that it might be wise to adopt certain policy regarding any branch of the work? Write the Association!

Has the movement in your locality, or your own company been peculiarly successful through methods adoptable by your associates in other parts of the field? Write the Association!

Have you run across items of information which might be of general interest to the Independent people? Write the Association!

Have you seen an unfair article or circular attacking the movement? Write the Association!

Are you in doubt regarding the wisdom of adopting certain methods by your company? Write the Association!

Dou you need real facts—solid arguments—to assist in holding a weak-kneed brother in line for the Independents? Write the Association!

Is your State at present without an Association and do you wish to know the best method of organizing it? Write the Association!

Let us make this office a Clearing House for ideas for the benefit of the movement. It is that already, but let us broaden the field. The idea is not new; not particularly. Ever since this office was established, we have been receiving advice and suggestions, and inquiries from all parts of the country. Some of the advice is very good; when practicable, it is followed. Some of the suggestions are timely and valuable; when it can be done, these are adopted. Many of the inquiries are pertinent; all such are answered.

Now let us extend this work. Everyone take a hand in it. From time to time under the heading shown above we will include in our monthly bulletins the best and most practicable of the suggestions received, with other matters along these lines that may be of value to our members. We can help each other—let's exchange ideas.

MAP AND STATISTICAL DEPARTMENT.

Now that the vacation season is over, we hope for better results in getting data for State maps. It is to your interest to give our requests for such data prompt attention. May we not have your co-operation in this important matter?

The Association will gather statistics for states not at present organized. Companies in such states are urged to forward figures regarding their plants direct to this office. State Associations which have not been giving this matter attention should arrange at once to gather the proper statistics. If desired, the Association will furnish copies of forms which have proven satisfactory in other states.

SHIELD ADVERTISING.

There has been an increased demand for the standard toll sign during the past month, particularly from New York State. This is encouraging as evidence that the importance of this method of advertising is not being overlooked. We know, however, there are many companies who are not as yet displaying the Standard signs as they should. Let us remind such companies that the "Official Shield" is the emblem of Independent Telephony and is being used in forty-three (43) States; that at the most conservative estimate there are over 12,000 cities and towns in the United States operated by Independent companies. Considering these facts, would it not pay you to see that at every exchange and pay station in the cities in which you operate, the Standard toll sign is displayed? And to follow this up by having the "Shield" shown on your directory covers, letter heads, and other printed forms? Do you not owe it to yourself and your associates in the movement to establish beyond all doubt your identity as Independents?

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TELEPHONE PATENTS

TELEPHONE CALL METER.

Charles T. Bradshaw, Philadelphia, Pa., patents (No. 822,719; dated June 5, 1906; filed October 3, 1903; serial No. 175,566) telephone call meter.

This invention comprises a meter or registering device which may be attached to a telephone instrument and arranged in such a manner as to be manually operated by the subscriber, for the purpose of keeping a check upon the number of calls charged up to him at the central office, in order to detect mistakes and overcharges by the telephone company. It includes a means for preventing the registering device from being operated when the telephone is not in use. This is secured by a combination of ratchet and pawl, so arranged as to be operated by a lever controlled by the position of the hook switch.

REPEATER.

Merrit Gally, Brooklyn, N. Y., patents (No. 817,761; dated April 17, 1906; filed April 14, 1904; serial No. 203,165) a telephonic repeater.

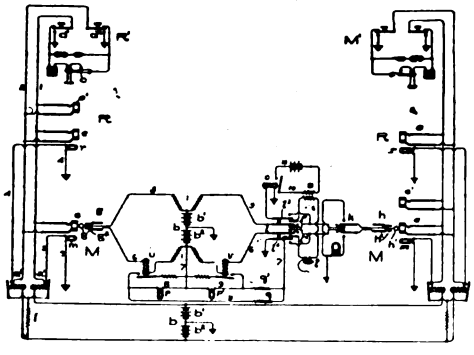
The inventor sets forth in the preamble to this patent that heretofore in repeating from one line to another it has been customary to employ two receiving magnets, two diaphragms and two retransmitting devices; one for each of the two lines. In this patent means are disclosed whereby only one retransmitting device is required, leaving only one diaphragm, which is acted upon by two separate receiving magnets. The inventor refers to previous patents granted to him: viz., Nos. 749,481, 751,845 and 753,257, in which only one diaphragm is used and operated upon by a compound wound receiving magnet, each of the windings connecting to one line respectively.

As this patent is too complicated to review at length in these columns, we would suggest that parties interested procure a copy for their personal investigations.

DIVIDED-MULTIPLE SWITCHBOARD SYSTEM.

Frank R. McBerty, Evanston, Ill., patents (No. 829,724; dated August 28, 1906; filed August 2, 1902; serial No. 118,059) exchange apparatus, and assigns to the Western Electric Company, Chicago, Ill.

The inventor describes a system which is particularly applicable to exchanges of the divided switchboard type. Keys d^1 d^2 are



provided at substations, connected with the sides 1 and 2, respectively, of the line, and designed to actuate relays a^1, a^2, connected with the line signals m and r at different places in the exchange. Current from battery through the relays is insufficient to light both of these signals at the same time, so that it is impossible for two signals to be sent in from a station simultaneously. The removal of the subscriber's receiver from the hook actuates both relays and extinguishes the signals, each lamp shunting out the other. A busy test is provided for by the apparatus at 10, which consists of a relay o, which is operated only by a relatively strong current.

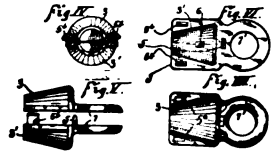
WOOD STRAIN-INSULATOR.

Thomas C. White, St. Louis, Mo., patents (No. 822,642; dated June 5, 1906; filed August 7, 1905; serial No. 273,188), a wood strain-insulator.

The object of the inventor is to provide a wooden strain insu-

lator in which the total strength of the wood will be retained, and so constructed that the wood will not be subject to the ingress of moisture.

Fig. 1 shows a side view of the insulator with one of the clips



in section. Fig. 4 shows a section of Fig 1 on the line y y. The end clips are formed of two halves, as shown in Fig. V; each provided with the ears 5 and 5b, which register with the holes 5a. These ears are intended to be turned after insertion, thus firmly holding the two parts of the clip together. Figs. VI and VII show these two parts separated. Projections 6 pierce the wood of the insulator and prevent the clip from slipping.

ANCHOR.

George D. Toy, Jr., Robert H. Toy and Hugh S. Toy, Sidney, Ohio, patents (No. 818,061; dated April 17, 1906; filed November 13, 1905; serial No. 287,094) an anchor.

This patent discloses the design of an anchor which is placed in position by being screwed into the earth. It essentially consists of a rod to which is attached an inverted cone-shaped end having a base larger in diameter than the rod.

Resting upon this cone is a casting which encircles the rod and to which is attached a spiral flange. The upper interior end of the casting is threaded for attachment to a hollow shaft employed to set the device in the ground. After the anchor is set the shaft is removed and the device is ready for use.

TELEPHONE TRANSMITTER ATTACHMENT.

Robert A. Walton, Los Angeles, Cal., patents (No. 823,092; dated June 12, 1906; filed May 25, 1905; serial No. 271,232) a telephone transmitter attachment.

The object of the inventor is to provide means for rendering a transmitter temporarily inoperative during a conversation, should the user so desire. The mechanism is contained in a cylinder, threaded at one end to engage the ordinary transmitter case, and at the other to engage the usual mouthpiece. Within this cylinder there is mounted a shaft, parallel to the diaphragm. One end of this shaft projects outward through a bearing in the cylinder and terminates in a knurled head. On the other end there is a disc, mounted eccentrically so as to be brought into contact with the rivet head at the centre of the transmitter diaphragm when revolved by means of the knurled head. The granular carbon is thus packed and the transmitter rendered temporarily inoperative.

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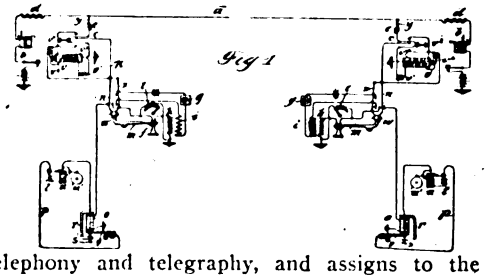
A modification of the invention provides for a design in which the mouthpiece is normally slightly unscrewed; when it is desired to render the transmitter inoperative it is screwed tightly in place and forces a lug, which is attached to the screen, against the diaphragm.

COMPOSITE TELEPHONY AND TELEGRAPHY.

Harry O. Rugh, Chicago, Ill., patents (No. 831,525; dated September 18, 1906; filed January 13, 1903; serial No. 138,865) com-



posite telephony and telegraphy, and assigns to the Western Telegraphone Company, of Minneapolis, Minn.

The telegraph equipment is shown at *b*, and the telephone apparatus connected between the line and ground through condenser *e*. The impedance *d* prevents the talking current from passing to ground through the telegraph apparatus, and the condenser *e* allows this talking current, and also a ringing current, which is of very high frequency, to pass to the telephone instrument. A calling device is provided, consisting of an induction coil *v*, wound on a core which serves to actuate vibrating parts to set up a rapidly varying alternating current. The signal receiving device, shown at *P*, consists of a polarized relay *o* and a vibrating bell *u*. A by-path through the adjustable impedance *l* is provided, which the inventor claims smooths out any telegraph signals which may leak through the condenser, and prevents them from influencing the telephone receiver. The switch v^2 allows a person to signal on the line without causing a noise in his own receiver.

TRANSMISSION SYSTEM.

Isidor Kitsee, Philadelphia, Pa., patents (No. 817,921) dated April 17, 1906; filed, June 24, 1904; renewed December 26, 1905; serial No. 293,327) a transmission system.

In this invention a plan is disclosed for employing a series of short lengths of wire as the conductors for each side of a line circuit. The conductors are so twisted together that each overlaps the adjoining section just one-half its length. For example let us consider a circuit composed of four sections, *A*, *B*, *C*, *D*, each of equal length. The first portion of *A* will constitute the induction coil and receiver circuit of one instrument. One half of *B* is then twisted with the second portion of *A*. Half the length of *C* is twisted with the remaining half of *B*, and the remainder is intertwined with half of *D*, the remaining portion of which forms the induction coil and receiver circuit of the second instrument. Transmission over this circuit is secured through induction from one section to another.

TELEPHONE SYSTEM.

Charles G. Burke and Edward J. Burke, Brooklyn, N. Y., patent (No. 826,534; filed August 6, 1904; renewed May 26, 1906; serial No. 318,744) and assign one-half to J. Q. A. Whittemore, Boston, Mass., a telephone system.

The object of this invention is to provide means for increasing the clearness and range of transmission. An electrolytic cell or combination of cells is connected in shunt with the telephone circuit and produces a counter E. M. F. which the inventors claim enables them to secure improved transmission.

CORD CIRCUIT.

Isidor Kitsee, Philadelphia, Pa., patents (No. 818,767; dated April 24, 1906; filed June 15, 1903; serial No. 161,619) a cord circuit.

The principal objects of this invention are to provide means for dispensing with the clearing out operation after a conversation is completed and also for the automatic application of the necessary current to signal the subscribers' instruments.

To accomplish these results the inventor employs a special form of jack and plug which when once brought in contact are held in that position by electromagnetic action, and upon the termination of a conversation are automatically released, the plug returning to its normal position on the cord shelf. A relay which depends for its action upon the condition of the called line is included in circuit between the two plugs of a pair and is employed for ringing purposes. When this relay is actuated a grounded circuit is completed over one of the line wires, through the bell at the substation to ground and back through battery to the relay contact, causing substation bells to ring.

LOCK-OUT DEVICE FOR TELEPHONES.

Ruben C. M. Hastings and Thurston Matheny, Athens, Ohio, patents (No. 821,800; dated May 29, 1906; filed April 4, 1905; serial number 253,846) a lock-out device for telephones.

The object of this invention is to provide a lock-out mechanism for the usual purposes, which shall be under the control of the calling subscriber. The accomplishment of this result is claimed to be secured through a combination of a third line wire, magnets, ratchets and link work, actuated upon the step by step principle by the closing of the circuit at the calling station a number of times corresponding to the number of the station desired.

ALARM SYSTEM.

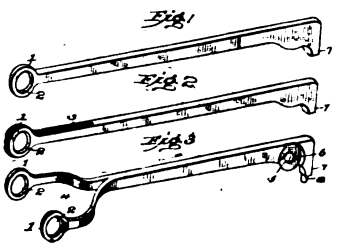
John J. Berry, Indianapolis, Ind., patents (No. 816,000; dated March 27, 1906; filed January 3, 1905; serial No. 239,438) and assigns to the Indianapolis Watchman Clock Company, Indianapolis, Ind., a combined telephone and watchman's alarm system.

The object of this invention is to provide a check upon the tours of watchmen through buildings. This is accomplished by connecting a plurality of factories through ordinary telephone circuits with an exchange equipped with mechanism which will automatically record the regular visits of the watchmen at each factory and enable any one of them to notify the operator in case of fire or other accident. The arrangement of the apparatus is such that the regular use of the telephone circuit is not interfered with.

SWITCH-HOOK.

James A. Wotton, Atlanta, Ga., patents (No. 830,696; dated September 11, 1906; filed June 17, 1905; serial No. 265,800) a switch-hook, and assigns to the Electric Manufacturing & Equipment Company, of Atlanta, Georgia.

A blank, shown in Fig. 1, is stamped from a sheet of brass,



and is then split, as shown in Fig. 2, by sawing a recess into the end of the blank. A special machine then separates and bends to the required form the prongs of the hook, and after the pivoted end has been drilled and finished the hook is completed.

TRANSMITTER.

Elmer R. Corwin, West La Fayette, and Frederick R. Parker, La Fayette, Ind., patent (No. 819,522; dated May 1, 1906; filed May 6, 1903; serial No. 155,871) and said Corwin assigns to said Parker a transmitter.

In this invention means are disclosed for the construction of a transmitter in which the circuit of the current is confined to the granular carbon and electrodes, the diaphragm and casing being insulated therefrom.

This the inventor accomplishes by special details of construction, one of which is the employment of a secondary diaphragm to support the front electrode. The air vibrations are communicated from the main to the supplementary diaphragm by means of a pin which maintains a normally even tension.

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IN THE MANUFACTURING FIELD

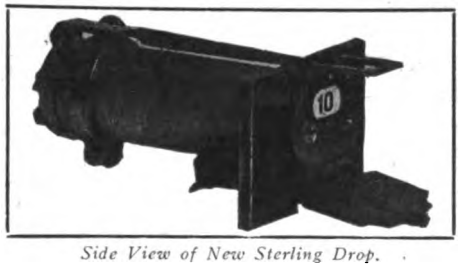
"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS".

THE NEW STERLING DROP.

FOR small magneto call switchboards and even for larger exchanges up to 500 lines capacity, there are certain advantages to be gained by the use of an interchangeable, single unit, plug restored drop. Aside from the fact that the operator, even though inexperienced, can hardly make a mistake in connecting the right numbers together and that a jack can be found even in the dark, there is the further advantage that a drop can be taken out of one position upon the board and removed to another without disturbing the number on the face plate. Thus, no matter how many drops have to be removed, or changed, the numbered position on the board always remains the same, although the face plate can also be removed and changed around if it becomes necessary. This makes it possible to place drops of different resistances, as a series or a bridging drop, in any part of the board or change them from one line to another, which is often done in boards of this type, without inconvenience either to the inspector or the operator. The inspector can find no objection because the drop can also be removed for inspection or repairs at any time and there are no screws, with possibly stripped threads, to remove or replace. All that is necessary is to simply remove the plug seat, which also acts as a lock nut, and loosen up the wires in the rear, a process requiring not more than half a minute's time. To replace the coil in the board it merely needs to be shoved into place and a few turns of the wrench locks it firmly into position. There is, therefore, no need of changing the line wires and spoiling the cable form should repairs to the drop be required. It is also a convenience to the operator, for she does not have to remember that "No. 46" belongs to some other line, for although the drop may be changed, the number tag remains.

Front View of New Sterling Drop.

The drop is fully armored and the armature so carefully balanced that it will respond to a very weak ringing current.

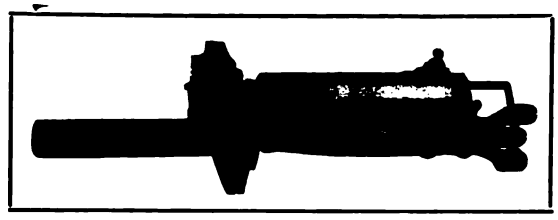


Side View of New Sterling Drop.

The operation of the drop is as follows:

When the subscriber rings in, the drop falls and in doing so it raises the end of a lever lying underneath the drop and back of the number plate, which in turn closes the night bell circuit; the shutter being quite heavy, a firm contact between platinum points is created, which makes as reliable a night bell contact as can be devised. When the operator inserts a plug, the lower part of this lever is raised, restoring the shutter to its normal positon and it cannot again fall back while the plug is in the jack. The drop coil is left open while the plug is in the jack, a clearing out drop being relied upon for disconnect signals. Heavy German silver springs are relied upon to make contact with the plug, and the plug seat is not part of the talking circuit at any time, while the insulation of the springs being of mica there will be no deterioration during the life of the jack. The restoring trigger which rises when the plug is inserted in the jack and restores the shutter is so very simple in operation and so simple in its mechanism that the company is willing to assert that there is little chance of its getting out of order at any time within ten or fifteen years.

Each drop being a single unit, boards of 100 or 300 line capacity can be ordered and only as many drops as may be needed for immediate requirements. With the growth of the exchange new drops can be ordered to fill out the board, with the full assurance that they will fit into place and that there will be no trouble with any of the connections if only ordinary intelligence is exercised.



View of New Sterling Drop from Beneath.

THE BAIRD MANUFACTURING COMPANY, 1526 Briar place, Chicago, Ill., has just issued a leaflet bearing the striking heading, "One of the Little Things That Count." This refers to the Baird No. 9 Counter, for use by operators in making a record of the number of calls answered. The company's booklet describes the operation and the advantages to be obtained by the use of this call counter, and gives names of a number of large and important telephone companies which have used the device for a number of years.

S. C. PLATT, who became so well known to a wide circle of telephone men during his long connection with the Kellogg Switchboard and Supply Company, and during the past year with Frank B. Cook, of Chicago, has recently decided to permanently sever his connection with the telephone field and has resigned his position with the latter firm.

He has made arrangements to enter the bond department of Edward B. Smith & Company, of Philadelphia and New York, one of the best known banking and bonding concerns in the country. Mr. Platt will make his headquarters in New York at No. 7 Wall street.

FRANK B. COOK, 238 West Lake street, Chicago, Ill., has just received from the War Department through some of the switchboard manufacturers, orders for 50 type L—3 frames equipped with No. 8 protectors.

For complete outside equipment or pole cable terminals he has received among others orders from the following places: Sussex, N. B.; El Paso, Texas; Concordia, Kans.; Sullivan, Ill.; Franklin, Pa.; Charleston, Mo.; Marion, O.; Little Rock, Ark. For subscriber's station protectors (either type B—4 or type B—5) the following: Paris, Ill.; Quincy, Ill.; St. Louis, Mo.; Brockport, N\ Y.; Atlanta, Ga.; Sussex, N. B.; Terre Haute, Ind.

Mr. Cook says he is also receiving heavy orders for his Universal guy clamps and on his self-welding wire joints.

THE DEVEAU TELEPHONE MANUFACTURING COMPANY, New York, has recently installed a number of its waterproof box telephones in the tunnel which is being built beneath the East River to carry the tracks of the Pennsylvania Railroad from Manhattan to Long Island City. The conditions in this tunnel are such as to give a severe test of the moisture-resisting qualities of the apparatus, and the DeVeau company regards the selection of its instruments by the engineers in charge of the tunnel work as an exceptionally valuable indorsement of merit.

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Gray Pay Stations Pay

ALL THE BIG CO'S WRITE US THE FOLLOWING

WE HAVE TRIED OTHERS BUT DO NOT FIND THEM SO SATISFACTORY

They Made the Test and Found Gray's the Best

Levers and Springs We Don't Use

GRAY TEL. PAY STA. CO. HARTFORD, CONN.

Automatic Shield

FOR SALE

For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE—One two position, multiple, Stromberg-Carlson toll board with 40 lines equipped, capacity 80 lines. Also one 500 volt motor generator, ringing machine; also one 2 H. P. 500 volt motor, both Holtzer-Cabot. Further information on request. Galesburg Union Telephone Company, Galesburg, Ill. 685

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

DRAUGHTSMEN wanted who are able to lay out plans for the interior cabling of large exchanges. Men who have done installing preferred. Address Box 672, care The American Telephone Journal, 100 William street, New York. 672

WANTED—Two natural born mechanics all around. Specialists on telephone switchboards, etc., men that will use figures in spacing off work; also handle lathes. Accuracy and neatness absolutely necessary. Address J. A. Gillin, Shop Foreman, care Pioneer Telephone and Telegraph Company, Oklahoma City, Okla. 681

WANTED—A steady and experienced cable splicer of good habits who wishes to permanently locate with an Independent telephone company of the middle east. Can learn something of interest by writing me. Good pay. Steady work all the year round. All correspondence considered confidential. Address Box 682, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 682

WANTED—A thoroughly competent telephone man with eight years' experience in magneto system desires position as repair man and lineman. Will go anywhere. Best of references given. Steady work wanted. Address Adna Miller, New Boston, Ill. 683

WANTED—Several men with factory experience as installers on central energy switchboards. Address Box 686, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 686

AUTOMATIC ENGINEER—Wanted, bright young man, preferably technical graduate, practical telephone experience, if possible automatic. Good salary, bright future. State particulars. Address Box 678, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 678

POSITION WANTED—As foreman by experienced cable man able to locate and repair troubles. Ten years' experience, best of references. Address Box 684, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 684

WANTED—Position as manager or superintendent of large Independent system in southwest. Six years' experience with large Bell company. Now manager of large exchange. Good reasons for desiring change. A1 references. Address Box 687, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 687

AUTOMATIC TELEPHONY—Have been connected with one firm six years, as collaborator and perfector of automatic exchanges, and was very successful. First-class general mechanic, expert on instrument work. Open for position where persistency, experience and ability count. Address Box 689, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 689

To the Management of LARGE EXCHANGES NEW OR OLD COS.

We Solicit Your Contracts for

Telephone Accounting and Filing Systems

and Auditing Work

Our experts will take the entire responsibility of furnishing our perfected copyrighted Blanks, Forms, Records and Supplies at lowest market prices, install the system and educate your office force.

N. B. Services reasonable. Correspondence solicited. Give size and scope of your company and present office conditions.

THE Edwards-Hine Co.

TELEPHONE SYSTEMATIZING DEPT.

5 and 7 PEARL STREET (EAST), GRAND RAPIDS, MICH., U. S. A.

Automatic? No.

We would like to run our big factory by windmill power, but you cannot "do things" with so uncertain a force. Ditto with Pay Stations. If you want uniform, clear and unmistakable signals and desirable features a powerful lever action is essential.

WRITE FOR BULLETIN NO. 51

BAIRD MANUFACTURING COMPANY, 1506 Briar Place, CHICAGO

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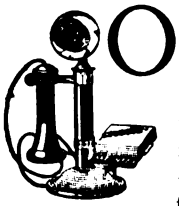
IN THE MANUFACTURING FIELD

A TELEPHONE MEMORANDUM ATTACHMENT.



ON the base of a telephone desk stand is the most convenient location for certain classes of memoranda relative to telephone conversations, etc. Many devices for attachment to the telephone are upon the market, but great difficulty is experienced in finding one which shall be large and substantial enough to serve as a writing pad and hold a sufficient number of leaflets for all practical requirements of such a stand, and still not be so bulky and so cumbersome, from the method of its attachment, as to be a nuisance upon the desk. The Telephone Memorandum Attachment Company, 639 Kasota Building, Minneapolis, Minn., believes that it has overcome the difficulties in the way of providing such a satisfactory arrangement in the device illustrated at the head of this article. The company will be pleased to send information and prices to all those who are interested.

NEW PROTECTIVE APPARATUS.

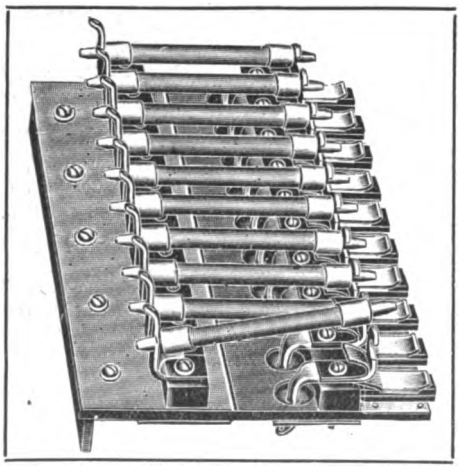
IN the two illustrations occupying the center of this page are shown the new protective panels Nos. 992 and 900, which have within a short time been devised and placed on the market by the American Electric Fuse Company, of Muskegon, Mich.

Each type consists of a combination of tubular line fuse with carbon lighting arresters. The line fuse is of the latest type manufactured by the American Electric Fuse Company, and made either of wood or fibre as desired by the purchaser. It is held rigidly in place by the new American hook type of spring contact with stiff German silver reinforcing springs.

The difference between the two styles lies in the mounting, the No. 900 protector being mounted on a hard maple base, and the No. 992 on an oxidized steel base. Both types are being extensively used, not only in offices but for cable box protection. The company has now on the press its new catalogue No. 31, which describes not only this apparatus, but many other forms of protective apparatus, some of which are standard, while other types have recently been developed.

EQUIPMENT RECENTLY ORDERED FROM DEAN COMPANY.

ONE of the largest Independent toll board, test board and telegraph equipments is to be installed for the United States Telephone Company, Cleveland, Ohio, under a contract awarded to the Dean Electric Company, Elyria, Ohio.



New Protector Panel, No. 992, Manufactured by the American Electric Fuse Company.

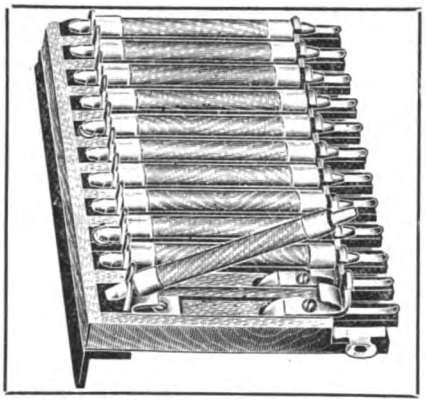
The main toll board consists of 25 operators' positions, in addition to chief operator's and assistant's desk, monitors' positions, supervisory sets and a messenger call system, which provides a special key for each operator's position. The Dean company is also to furnish calculagraphs, intermediate distributing frames, relay, repeating coil, condenser and cable racks.

The test board is to be of three positions, arranged for all modern telephone and telegraph testing and connecting apparatus. There will also be two repeater tables, duplicate charging and ringing machines, duplicate sets of sixty cells each of storage battery cabinet, Morse and fuse panels, power board, and complete telegraph transmitting apparatus.

It is to be one of the most complete long distance toll operating and test boards for simultaneous telephone and telegraph work yet devised.

In addition to the Cleveland installation the following contracts have just been received.

People's Telephone Company, Butler, Pa., one 3,000 line, common battery multiple board equipped for 1,200 local lines and 10 rural lines. This is in addition to one two-position, 20-line toll board arranged with line switching keys for switching the toll lines to the local positions for night service. Duplicate charging machines, duplicate harmonic converters, storage battery, power board, intermediate distributing frame, relay rack, besides chief operator's and wire chief's desks will be furnished.



American Electric Fuse Company's New No. 900 Protector.

The Petroleum Telephone Company, Titusville, Pa., has ordered a 2,000 line common battery multiple board, to have 3 sections equipped, 2 toll positions equipped for 40 lines, intermediate distributing frame, relay rack, charging machines, duplicate storage batteries, duplicate harmonic converters, power board, chief operator's and wire chief's desks.

The Petroleum Telephone Company has ordered for Franklin, Pa., a 2,000 line common battery multiple board with 4 sections equipped, 3 toll sections with an ultimate capacity for 60 toll lines, duplicate harmonic converters, charging machines, duplicate storage batteries, main and intermediate distributing frames, relay rack, chief operator's and wire chief's desks.

The Tuscarawas County Telephone Company, Canal Dover, Ohio, is to have a 1,200 line common battery multiple board, charging machine, duplicate harmonic converters, duplicate storage batteries, power board, main distributing frame and relay rack.

Other orders are from the Cuyahoga Telephone Company, Collinwood, Ohio, for a 2,000 line common battery multiple board with solid mahogany finish, 3 sections to be equipped, and duplicate harmonic converters; the Walton Telephone Company, Walton, N. Y., 1,000 line common battery multiple board, completely equipped for Dean harmonic party line signaling; the Statesville Telephone Company, Statesville, N. C., a 1,200 line common battery multiple board, with full Dean selective party line equipment with duplicate harmonic converters.

All of the above contracts are for complete Dean harmonic party line equipment with 4 party individual indicating ringing keys, metal lamp jacks, spring metal lamp caps, test cords and keys for each position for testing cords, line and supervisory relays.

In addition to the common battery contracts above mentioned a 1,000 line magneto multiple board with 4 party indicating keys has been sold to the Salene Telephone Company, Marshall, Mo. This board is entirely modern in every respect and is fully equipped for Dean selective 4 party line system, duplicate harmonic converters.

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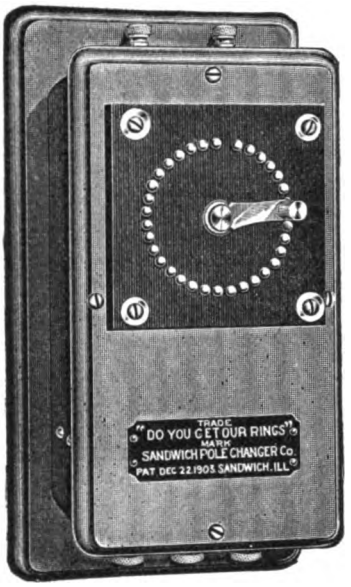
TO GET THREE OUT OF TWO SEEMS IMPOSSIBLE

Yet the Illinois and Sandwich Duplexers easily make two metallic circuits into three



Just stop and think what this means to you in increased facilities without spending a cent for new line construction.

Here are the facts in the case: By connecting our duplexers to the two existing metallic circuits a new one is formed which utilizes each pair of wires as one side of an independent metallic line.

To eliminate all noise due to induction we provide a very simple and efficient balancing device which requires no skill in its manipulation and which will make the new circuit absolutely quiet.

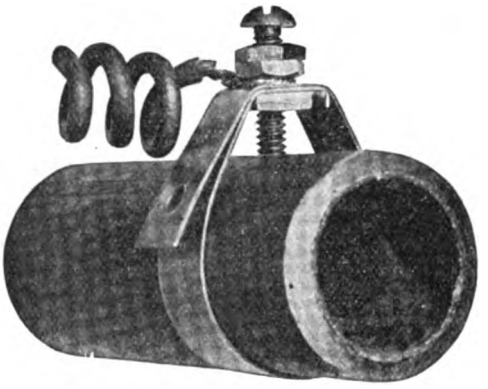
Seems almost too good to be true. Let us prove it by sending a set on 30 days free trial.

We know you are interested; therefore don't delay, but write to-day

Sandwich Pole Changer Company

400 Eddy Street, Sandwich, Ills.

Blackburn Ground Clamps



For connecting ground wire to pipe or ground rods.

They are equal to a soldered connection and much cheaper.

You cannot afford to be without them.

Write your jobber to-day and place a small trial order with him.

Thousands of these clamps are in use, and are giving the best satisfaction.

National Telephone Supply Company

Distributing Agents

3923 Superior Avenue **Cleveland, Ohio**

Are You Building for the Present or the Future?

This is a vital question. Perhaps you haven't given as much thought to it as you should.

Poles on the average do not last more than eight years. The available supply is rapidly diminishing, hence when the time arrives for reconstruction the cost will be considerably more than it is at present.

The question then is, "Can the life of poles be extended?"

The answer is, "Yes, by using Avenarius Carbolineum."

This liquid preparation will double the life of poles to which it is applied and at the same time strengthens the fibre of the timber.

Write for book of proof and ask for prices. You will be surprised.

Cheap as Paint. Good as Gold

Carbolineum Wood Preserving Co.

126 Reed Street Milwaukee, Wis.

An Exact Timing Instrument for Toll Lines

THE CALCULAGRAPH

A great advance over the old, cumbersome method of timing messages.

The Calculagraph determines the overtime charge, prints it on a card, saves the operator's time and improves the service, while increasing the revenue from the toll lines.

Profitable in both small and large exchanges.

It makes no clerical errors.

Write for booklet.

The Calculagraph Company

1487 Jewelers Building NEW YORK CITY

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THE WEEK'S MESSAGES

NEW COMPANIES.

DE KALB, ILL.—After considerable agitation in DeKalb County, an Independent telephone company, to be known as the People's Telephone Company, has been organized with a capital stock of $25,000. The headquarters of the company are to be located at DeKalb, Ill., and the following officers and directors have been elected: President, B. F. Wyman, Sycamore; vice president, A. S. Bean, Waterman; secretary and treasurer, C. M. Campbell, Genoa. Directors: B. W. Lyons, Waterman; V. A. Glidden, DeKalb; Robert Renwick, Mayfield; Franklin Hall, Sycamore; Arthur Dodge, Malta; C. M. Davis, Esmond; Charles Sward, Hinckley; George Dicks, Mayfield; I. Vanderberg, Kingston.

HARRISBURG, ILL.—The Harrisburg Independent Telephone Association, Harrisburg, Ill., has been incorporated to construct and operate a telephone system at Harrisburg. The capital stock is named at $2,500, and the incorporators are John T. Wheatley, W. D. McIlrath and A. P. Brown.

ST. CLOUD, MINN.—Articles of incorporation have been filed by the Luxemberg Telephone Company, the incorporators being N. B. Block and a number of prominent farmers in Luxemberg, St. Cloud and Fair Haven townships. The company is capitalized at $2,000, and it is its intention to build a line throughout Luxemberg and connect with the main line running to St. Cloud. The life of the charter is to be thirty years.

AKRON, OHIO.—The Independent Telephone Building Company, of Akron, Ohio, has been incorporated with a capital stock of $35,000. The incorporators are Charles H. Lahr, Charles Currie, R. E. Inskeep, G. McAlonan and F. H. Stuart.

MARSHFIELD, OREGON.—A new telephone company has been organized in Marshfield. Prominent Marshfield citizens are back of the enterprise, and it is their intention to construct a line from Marshfield to Gardiner, through the Tenmile country.

GAINES, PA.—Articles of incorporation have been filed by the Elk Run Telephone Association, of Gaines, Tioga County. The company is capitalized at $5,000, and it is its intention to construct and maintain lines throughout Potter and Tioga Counties.

MIDDLETOWN, PA.—The Middletown Telephone Company, which recently applied for a charter, has been incorporated with a capital stock of $20,000. The president and chief stockholder in the new company is ex-Congressman B. F. Meyers, of Harrisburg, one of the pioneer Independent telephone men of the State of Pennsylvania. He was the organizer of the Cumberland Valley Telephone Company, now one of the underlying companies of the United Telephone and Telegraph Company, and is the only president the Cumberland Valley Company has ever had. Mr. Meyers is also first president of the Pennsylvania State Independent Telephone Association. The main office of the new company is to be located at Harrisburg, with the principal exchange at Middletown, Dauphin County. Important lines will be constructed to Elizabethtown, Lancaster County; Humelstown, Dauphin County; Mechanicsburg, Cumberland County, and to Harrisburg. A short line will also be built in northern York County. Among the stockholders of the company may be mentioned Frank D. Houck and W. P. Beardsley, of Harrisburg, general superintendent and traffic manager, respectively, of the United Telephone and Telegraph Company; F. E. Ziegler, of Harrisburg, and Simon P. Light, of Lebanon.

SIKO, PA.—The Wayne Telephone Company has been incorporated with a capital stock of $5,000. The company contemplates the erection of lines from Honesdale to Dyberry, Siko, Cold Springs, Haines and Tanner's Mill, Wayne County, with principal offices at Siko, Pa. The incorporators of the new company are John W. Ridd, Dyberry; Lafayette W. Nelson and Leon Mitchell, Siko.

SOUTH CANAAN, PA.—Articles of incorporation have been filed by the South Canaan Telephone Company, with the following incorporators: Eugene Swingle, John Bentham, F. J. Shaffer, South Canaan; W. J. Bone, G. W. Dershimer, W. R. Shaffer, Varden. The company's lines will run from South Canaan, at which point its principal offices will be located, connecting with the Wayne and Lackawanna Telephone Company, to Ariel, Waymart and Archbald.

HOLLAND, TEXAS.—The Holland Independent Telephone Company, of Holland, Bell County, Texas, has been incorporated with a capital stock of $7,000. Among the incorporators may be mentioned W. R. Wallace, P. L. Stone and J. B. Stone.

LANGFORD, MANITOBA, CAN.—Notice has been given that Letters Patent have been issued incorporating William C. Pollock, James C. Drysdale, Robert Hunter, Walter Dryden, James Dark, Duncan McLaren and John McLaren, all of Langford, Manitoba, as the Union Farmers' Mutual Telephone Company, for constructing, owning and operating a telephone system. The capital stock is fixed at $20,000.

BRANTFORD, ONT., CAN.—A charter has been granted to the American Machine Telephone Company, Limited, of Brantford. The company has a capital stock of $450,000. The incorporators are H. N. Baker, A. E. Knox, T. E. Moulden, of Toronto, and others.

FRANCHISES.

COLUSA, CAL.—The Colusa County Telephone Company, Colusa, Cal., recently organized, is preparing to put its system in operation. It is backed by influential local men; and, judging from the advance business claimed to have been done, the new company will no doubt fill a long felt want. The company has applied for franchises in Glenn and Tehama Counties, and it is said that later these companies will transfer their holdings to the Home Telephone Company of San Francisco.

YUBA CITY, CAL.—Attorney Hewitt, representing Dr. Jacobs, has made application for a new franchise, which will be advertised and bids received by the Board of Supervisors in October. This application is the result of active competition between Dr. Jacobs and representatives of the Sunset Telephone Company, which has on two occasions forfeited the deposit made on the purchase price of the franchise through failure to pay the balance due.

FARGO, N. D.—Application will be made in Fargo for a franchise by the North Dakota Independent Telephone Company, recently organized. A line will be run west from Fargo to Montana.

CHEHALIS, WASH.—Application has been made for a franchise by the Home Telephone Company, a farmers' organization, that will give it permission to use most of the thoroughfares of Lewis County in extending its system. The company already has many miles of service working satisfactorily in eastern Lewis County, and the plan of a co-operative company has proved a great success.

FINANCIAL.

LOS ANGELES, CAL.—The Union Home Telephone and Telegraph Company, of which Colonel J. M. C. Marble is president, and James V. Baldwin, secretary, has filed a certificate of the creation of a bonded indebtedness with the county clerk. The capital stock of the company is $10,000,000, and the indebtedness will consist in a like amount, to be evidenced by 10,000 bonds of $1,000 each, bearing 5 per cent. interest. The indebtedness will be secured by a deed of trust executed to the Title Insurance and Trust Company of Los Angeles, conveying to the latter all of the property of the Union Home Telephone and Telegraph Company. This action marks the completion of the great organization which has acquired most of the Independent companies in Southern California, and which expects to take in the others until all the lines are merged into one system. The stock of the company has all been underwritten and it is its intention to extend all the local systems.

HILLSBORO, ILL.—The Mutual Telephone Company, of Hillsboro, Ill., has increased its capital stock from $10,000 to $15,000.

BROCKTON, MASS.—The Home Automatic Telephone Company, which has formally accepted the franchise granted by the board of aldermen, is to deposit $15,000 prior to commencing operations. Work will begin before February 13, 1907, and the system will be completed and in operation inside of two years.

MARQUETTE, MICH.—A meeting of the stockholders of the Marquette County Telephone Company is to be held for the purpose of considering the question of increasing its capital stock for the purpose of improving and enlarging its system.

ROCHESTER, N. Y.—The United States Independent Telephone Company in order to meet the demands of growing business has authorized an

NEWS—WANTED

THE matter contained upon the message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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Perfect Contact

Means more than increased conductivity—it means longer life to the joint because corrosion can't take place.

COOK'S SELF-WELDING WIRE JOINT

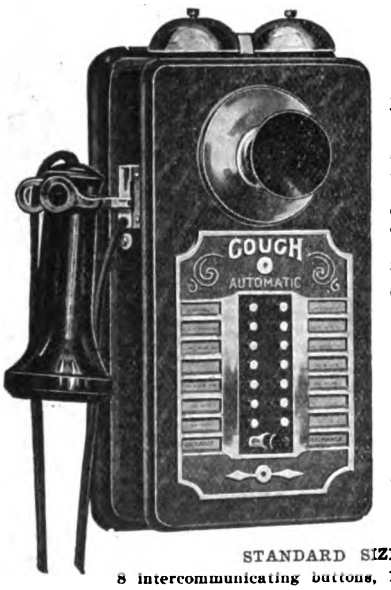
makes a permanently perfect joint every time. Free Sample to show you.

Frank B. Cook

238 W. LAKE ST. CHICAGO

COOK JOINT AFTER TWISTING.

One Extra Button



down at the bottom of the front plate enables you to connect your instrument direct to the city exchange. The other buttons are for intercommunicating service. The city exchange can also call up any station on your system.

Automatic reset—the station is left in condition to be called after using.

Trunk Button

Send for Catalogues

STANDARD SIZES:

8	intercommunicating buttons,	1	exchange	button	
14	"	"	1	"	"
18	"	"	1	"	"
24	"	"	1	"	"
28	"	"	1	"	"

100% CHEAPER THAN BRANCH EXCHANGE.
100% QUICKER; 100% MORE SATISFACTORY.

S. H. COUCH CO., Inc., Manufacturers
162 PEARL STREET, BOSTON, MASS.

MICHIGAN WHITE CEDAR POLES

In addition to the several yards we have had in the past, we wish to call your attention to our new yard which is located at Escanaba, Mich.

The acquisition of this new yard enables us to ship poles by all railroads or by the lake routes, thereby enabling us to give the best delivered prices.

The location of our new yard makes it easier to secure cars, thus facilitating prompt shipment.

In many cases poles can be shipped by car-ferry, making possible a great saving in cases of shipment to Eastern points.

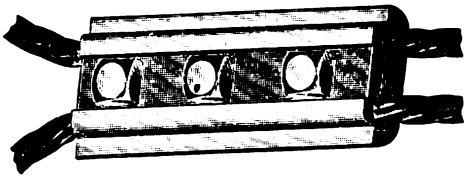
We are wholesalers exclusively, shipping in car lots only.

Write us for delivered prices and "Pole Booklet No. 3-A." Yours for the asking."

KELLOGG SWITCHBOARD & SUPPLY CO.
CHICAGO, ILL.

The Norton D Clamp

Solid Forged Steel



It isn't cast. Never breaks nor slips. 9-32 to 1-2 inch strand.
We Make Construction Specialties. Write for Catalogue.

NORTON TOOL COMPANY
West Park, Ohio

Please mention THE AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

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THE WEEK'S MESSAGES

issue of $2,500,000 of collateral trust 6 per cent. two year notes and bonds. The security for the above notes is conservatively estimated at $5,000,000, or twice the amount of the notes, and is deposited with the Rochester Trust and Safe Deposit Company.

CLARINGTON, O.—The capital stock of the Home Telephone Company, Clarington, Ohio, has been increased from $5,000 to $30,000.

GOLDENDALE, WASH.—The capital stock of the Goldendale Telegraph and Telephone Company has been increased from $3,000 to $12,000.

ELECTIONS.

SOUTH BEND, IND.—The reorganized South Bend Home Telephone Company has elected the following officers and directors: President, Theodore Thorward; first vice president, Horace G. Miller; second vice president, C. C. Wheeler; secretary and assistant treasurer, Elmer R. Stool; treasurer, Sanford Harris; auditor, W. I. Patton. Directors: Charles T. Lindsey, Narion B. Staley, D. D. Bates, H. A. Harris and Albert E. Wilson.

HYANNIS, MASS.—The Cape Cod Telephone Company has elected the following officers: President, F. P. Goss; treasurer, A. E. Guyer.

GRAND RAPIDS, MICH.—The following directors have been elected by the Citizens Telephone Company of Grand Rapids: C. F. Rood, E. B. Fisher, Philip Graham, Lester J. Rindge, Gaius W. Perkins, Robert D. Graham, Elbridge G. Studley and Joseph B. Ware.

PERSONAL.

T. C. AINSWORTH has taken charge of the soliciting department of the Wabash Valley Telephone Company's exchange at Paris, Ill.

J. W. CAMPBELL, formerly contract agent for the Iowa Telephone Company at Ottumwa, Ia., is now contract agent for that company at Des Moines.

WILLIAM H. FOX has been appointed manager of the Burlington (Vt.) exchange of the New England Telephone and Telegraph Company.

O. O. MITCHELL has been appointed superintendent of construction by the East Tennessee Telephone Company. He will have his headquarters at Chattanooga, Tenn.

CLARENCE SEVERSON has been appointed manager of the Central Union Telephone Company's local exchange at Crawfordsville, Indiana.

GEORGE F. SILVIA has been made manager of the construction and operating departments of the Commercial Union Telephone Company, with headquarters at Glens Falls, N. Y.

HENRY E. SNOW has been appointed manager of the Glens Falls, Sandy Hill and Fort Edward district of the Commercial Union Telephone Company of New York.

JOSEPH F. STOCKWELL, at present general manager for the Independent Telephone Company of Syracuse, N. Y., has accepted the position of assistant general manager with the Keystone Telephone Company of Philadelphia.

HARRY WESTBROOK has been made manager of the Pioneer Telephone Company's exchange at Guthrie, Okla.

MISCELLANEOUS.

ST. LOUIS, MO.—The new office building of the Kinloch Telephone Company, of St. Louis, at Granite City will be occupied at once, and will be the headquarters for Granite City, Madison, Venice, Brocklyn and Newport.

MOUNT HOLLY, N. J.—The property of the Inter-State Telephone Company has been formally transferred to the reorganizers of the concern, and better service to the public is promised on all the lines. The contemplated improvements will nearly all be made in the northern part of New Jersey.

SHERMAN, TEX.—The Grayson County Telephone Company of Sherman, Tex., is again operating after having been out of service for some days, owing to a fire which destroyed the entire board and terminal rack of 800 lines.

WHEELING, W. VA.—The council police committee last evening decided to recommend the adoption of the police signal system proposed by the National Telephone Company of West Virginia, and will ask that contract be made.

MOOSE JAW, SASK., CAN.—The Saskatchewan Telephone Company, whose headquarters are in Moose Jaw, has established connections with Winnipeg.

New Construction in the Field

MANHATTAN, CAL.—The Consolidated Telephone and Telegraph Company contemplates the construction of a line from Manhattan to Monarch, at which point an exchange is to be established, the site having already been selected.

REDDING, CAL.—It is the intention of the local telephone company at Redding to entirely rebuild its system at that point, making it thoroughly up-to-date in every particular.

RINCON, CAL.—A new line is being constructed by the Home Telephone Company from Auburndale to Rincon.

WILMINGTON, DEL.—A cable for the Wilmington Light, Power and Telephone Company is being laid across the Christiana River.

TITUSVILLE, FLA.—The Titusville Telephone Company is to lay a submarine cable from City Point to Courtney. The telephone wire will be stretched through Indianola, Merritt, Georgiana and other towns on Merritt Island, connecting with the lines of the east coast of Florida.

LEWISTON, IDAHO.—The Nez Perce Co-operative Telephone Company has extended its lines to Grangeville, Idaho. It is the intention of the company to construct a system in that city which shall give a strictly first class service.

CAIRO, ILL.—The Cairo Telephone Company has under consideration the erection of a new telephone building for its offices and exchange.

MAROA, ILL.—Work on the construction of the new exchange for the Maroa Telephone Company has been commenced. The building will be conveniently arranged and attractive in appearance.

ANDERSON, IND.—The Union Telephone Company is to place some of its wires underground in Anderson.

CEDAR RAPIDS, IA.—The Cedar Rapids and Marion Telephone Company is constructing a line between Cedar Rapids and Tipton.

KEOKUK, IA.—A line has been constructed by the Keokuk Township Telephone Company through Mars Kill to Ottumwa, Ia.

LITCHFIELD, MICH.—The Everybody's Telephone Company has recently completed a toll line to Hillsdale, enabling the subscribers of the Homer Telephone Company to have direct communication with the city of Litchfield and points south of it.

ALPENA, MICH.—The Northeastern Telephone Company is building additional lines between Alpena and Bay City.

WINDOM, MINN.—The lines of the Mutual Telephone Company are being extended in Amo township.

BEATRICE, NEB.—The Home Telephone Company contemplates the construction of a line from Beatrice to Rockford, which will place Beatrice in direct communication with that town.

CAMDEN, N. Y.—The Camden Home Telephone Co. has nearly completed its line to Osceola, which makes a total of ninety miles of toll lines constructed since last November. The company also operates exchanges in Williamstown, Redfield, Camden, Vienna and Sylvan Beach. It also has numerous farmers lines leading from Camden, and gives excellent long distance service, its toll lines connecting with those of the Rome Home Telephone Company on the south, and those of the Black River Telephone Company on the north.

BARBERTON, OHIO.—The People's Telephone Company has obtained permission to string additional wires in the city of Barberton.

CLARKSON, O.—The Columbiana County Telephone Company is constructing a new line between Clarkson and Calcutta.

CRESTLINE, OHIO.—A telephone line is to be built from Crestline to Chicago, Ohio, by a number of farmers.

IRONTON, O.—The Home Telephone Company has secured a site for its exchange and offices, and will at once begin active work putting in its plant.

MARIETTA, OHIO.—$50,000 will be spent by the Marietta Telephone Company in improving its system. A new switchboard will be purchased and underground and aerial cable will be used.

LONDONDERRY, O.—A telephone line is being constructed by Samuel N. Boyce in Londonderry.

TOLEDO, OHIO.—It has been announced that the National Telephone Company, of Wheeling, has closed a contract with the United States Long Distance Company, by which a new long distance line is to be built from Wheeling to Cambridge, Ohio.

WARREN, O.—The Niles Telephone Company, of Niles, has asked permission of the Warren council to lay its wires underground in Warren.

COOPERSBURG, PA.—The directors of the Coopersburg Rural Telephone Company are to hold a meeting to consider the proposition of extending the company's lines to connect with the Franklin Company's lines of Springfield.

PITTSBURGH, PA.—The P. & A. Telephone Company is running two new trunk lines through McKeesport. It is the intention of the company to run the lines from Pittsburgh to Uniontown, by way of Yough Valley.

WHEELING, W. VA.—The National Telephone Company, of Wheeling, will build a line from Wheeling to Cambridge, Ohio. This will give direct connection from Columbus and Toledo.

LLANO, TEX.—The Texas Telegraph and Telephone Company has recently installed in Llano a total of 143 telephone stations.

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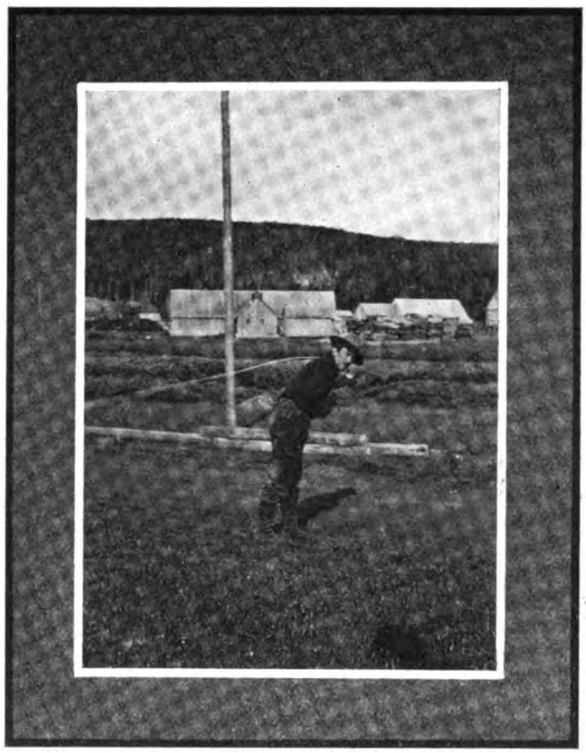
Telephones and the Forest Reserves

By Bristow Adams, Expert, U. S. Forest Service.

AMONG the newer and more unique uses of the telephone is one that has received Government sanction in connection with the administration of the Forest Reserves. The installation of telephone service in the national forests, where there is necessarily much isolation, is counted on not only to prove of great convenience to those engaged in the administration of these tracts, but also to save many thousands of dollars, and perhaps even many lives.

In the first case the telephone will serve the same uses as it does in the big agricultural stretches of the West, where it has been a potent factor in relieving the rancher and his family from the terrible nervous strain of an enforced isolation. It has even been claimed that insanity has decreased among farm women since the telephone has come into rural use. Then also the convenience in the transaction of general business between farmers, and with the general public has meant many reforms and the saving of incalculable time. These things being true in respect to rural districts, how much more are they true of the telephone in its relation to the forest reserves and the daily life and work of the forest ranger and his family absolutely isolated from their fellow beings, in some cases dwelling at least fifty miles from the nearest settlement, and twice that distance from the headquarters of the forest Supervisor whose consultation and advice is often needed. Then, too, the general public in or near forest reserves has to do business with reserve officers and the telephone in a moment can obviate the necessity of a day's journey, and a journey that may be, and often is, fraught with danger.



Lineman Hauling Wires Near the Terminus of the Forest Service Line in the Big Horn Reserve.

But it is in cases of emergency in the forest that the telephone becomes the instrument of salvation; and no greater emergency is likely to arise than that engendered by the most serious menace to the forest and to forest life—fire. The prevention and control of forest fires is the most important and the most difficult work that confronts the forest reserve force, since fires annually cause more loss than all other destructive agencies combined. Forest fires in the United States each year consume property to the value of one-tenth of the entire forest product of the country. Moreover this immense record of destruction takes into consideration only such immediate loss as may be calculated or approximated, and can not measure permanent losses to the forest, and to the resources dependent upon it.

Forest fires, generally speaking, can not be coped with after they have become fully started, and sweep over the country without meeting any resistance, destroying everything in their path and wiping out life and property. In brief, the only possible way to control fires is to prevent them, or reversing the recipe for rabbit pie, the idea is, not "first catch your fire," but "catch your fire first." In this catching of the fire in its inception, the telephone plays an important part. A single example will suffice: A forest ranger in the California mountains leaves his cabin in some secluded valley to take up his round over the part of the reserve under his immediate control. His trails are well kept, his telephone is in order, with call boxes arranged every few miles along the paths and fire lanes. He comes upon a place where a party of campers or prospectors have left their camp fire without stamping it out. In the interval between their departure and his arrival a ground fire in the dry forest carpet has become too large for him to cope with alone, though his efforts may be able to check it for a limited time, particularly in its most dangerous direction. In such a case he can remain to fight the fire to the best of his ability and hold it in check until help from the Supervisor, or other rangers with a suitable force, can arrive from a distance.

The picture is not so pleasant if it is drawn from an instance where the telephone system is lacking. A fire breaks out in a district remote from any help. The ranger may discover the blaze after it is beyond the control of a single man, and assistance must be secured before there can be any hope of effectively stopping it. But his district is a day's ride from a settlement, maybe two or three days' ride from the Supervisor's headquarters. There is a choice between two courses of action, both of which are almost hopeless. He may try to hold his ground and work in utter futility to stop flames that readily get beyond his control. If he leaves at once for help, some days may elapse before he gets back with men and fire-fighting tools. During his absence the wind may have arisen and he returns with his force to find thousands of acres burned over, and the men at his command practically as powerless against the larger fire as he was against the incipient one.

These two contrasting cases will serve to show instances where the telephone would be valuable. Even a fire of some severity at the outset can be held in check by one man, especially

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if he is working, not with the idea of a hopeless task to be grappled with alone, but buoyed up with the certainty that he is to do his best until he gives way to a sure and effective relief. The mental attitudes under the two conditions must be considered as important factors, because a man will work harder, longer, and with less fatigue if he sees a relief or a reward ahead. It has been stated that the boy who held his hand in the dyke crevice through a long night's vigil could not have done so had he not been sure that dawn would bring the Holland villagers and relief. Without reflection on a ranger's courage and tenacity, it is safe to assume that he would be less likely to fight long and hard to combat a fire if he felt that the struggle were not only hopeless but endless.

The use of telephones on forest reserves is not a suppositional nor a merely contingent matter. They have been tried and proved by time, and although the Government has no telephone service of its own in operation, there is one under construction in the Big Horn Forest Reserve in Wyoming, where the first line will be 109 miles long, connecting the rangers' cabins in the reserve with the Supervisor's headquarters at Big Horn.

Piling Brush after Construction of Telephone Line, in Lodge Pole Pine Forest.

The preliminary work was done by an expert in telephone construction detailed from the United States Weather Bureau, and the material has been purchased. Actual construction was to have been begun in the spring, in order that the line might be available for the protection of the forest during the season when fires are most prevalent. It was held up until later, however, on account of the fact that the appropriation did not become available until the first of July. The construction cost, it is estimated, will average $30 per mile, or about $3,300. The total cost of supplies for the line, exclusive of instruments, which are to be leased from the Bell Telephone Company, amounted to $2,400 laid down at Big Horn, Wyo. The wire was obtained from Du Perow, of Washington, D. C., at a total cost of $1,897.50, and the insulators, brackets, and kindred equipment from the Electric Appliance Company of Chicago. The construction of still another telephone system was authorized under the Government, providing for five miles of Government telephone lines on the Pikes Peak Forest Reserve in Colorado. Construction on this line was begun as soon as the appropriation became available at the beginning of the present fiscal year.

The comparatively low cost of such lines, owing to the presence of poles on the ground, and even the use of standing trees, is one of the things which will contribute to their extension. The very simple methods of construction are made evident by the photographs taken during the progress of the work on the Big Horn Reservation.

Supplementing the proposed Government telephone lines are a number of private lines constructed under permit from the Forester, who grants a right of way across a forest reserve only on condition that the forest officers shall be allowed free use of the line for official business. So far there have been permits granted to nineteen individuals or companies for an aggregate of more than 140 miles of line, which may be used for the protection of the forests in several different localities.

Upon the success of the Government lines under construction will depend an extensive adoption of telephone systems on all reserves, though it is already established and understood that their use is attended with excellent results. It is probable that in winter these lines will suffer considerable damage, but as this is the time when there is likely to be no demand for their use no serious difficulties will be experienced. In the spring a few days' labor will put them in order.

The details to be considered in laying out these forest lines will vary more or less in different localities, but in general will be determined partially by the contour of the country, and perhaps to a larger extent by the location of trails used by the rangers or forest patrol. Wherever possible the line should be carried within a reasonable distance of high places in the reserve, which may

Line Wagon and Reel, Stringing Line. This Wagon is the Only One Used in Construction and in Moving Camp During the Progress of Work on the Big Horn Reserve.

Docking Tree for Pole and Clearing Right of Way for Line. Dead Branches which Interfere with Line are Frequently Knocked off with a Pole Instead of Cutting the Trees.

Setting Pole in Hole where Absence of Sufficiently Large Trees Prevents Making Poles by Docking. Poles are Hauled Along Right of Way by Saddle Horse and Rope.

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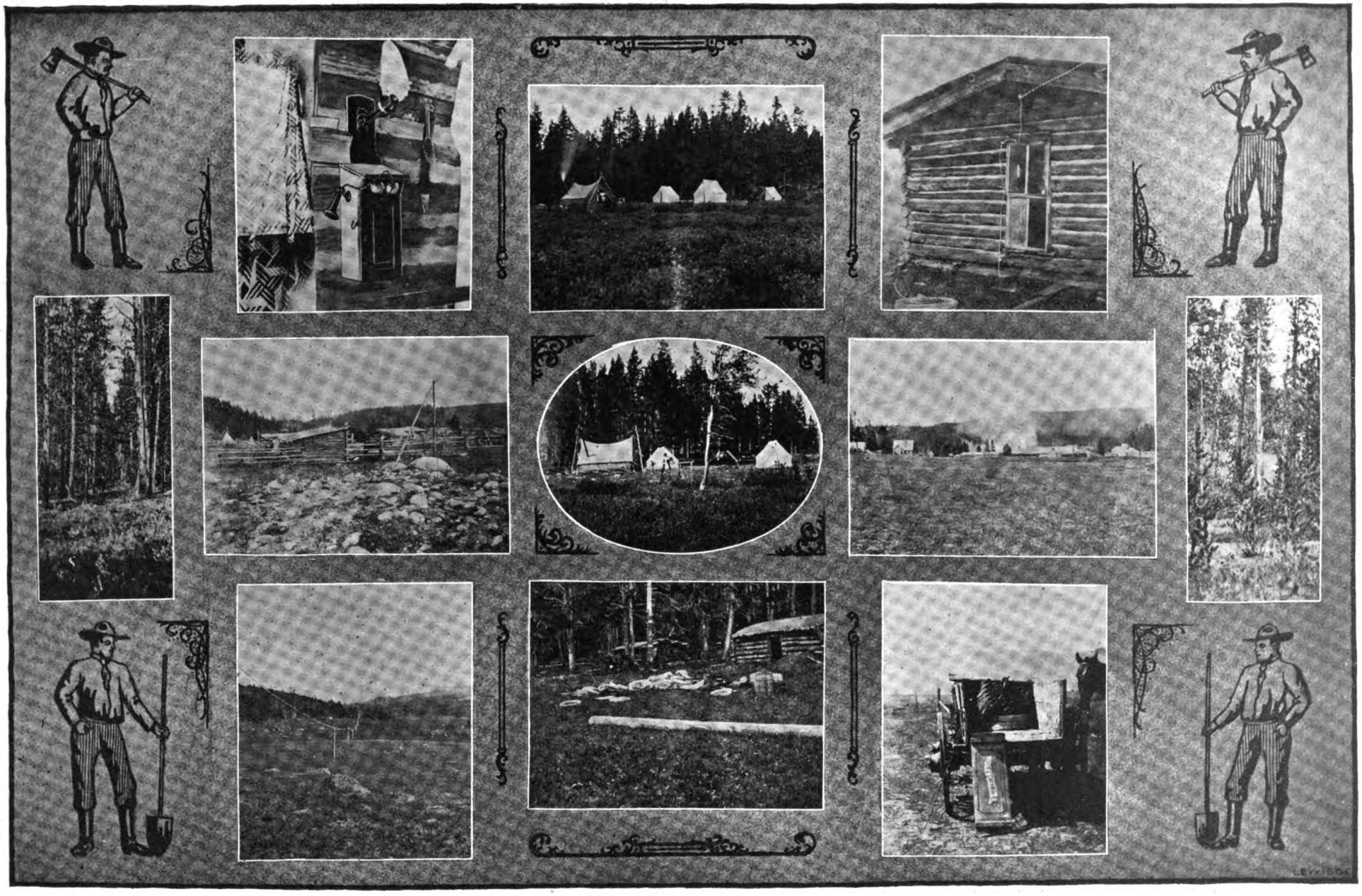

Telephone right of way, forming also a new and useful road. Wires supported on docked trees.

Telephone in Forest Ranger's cabin at end of line.
Ranger's cabin on border of reserve, where line terminates.
Straight construction, where the line crosses an open mountain meadow.

Camps of the construction crew, in the Big Horn Forest Reserve.

Telephone supplies beside abandoned cabins of homesteaders or herders.

Outside connection at terminus of telephone line in Forest Ranger's Cabin.
McShane's, headquarters camp and sawmill in Big Horn Reserve. Large building on left is headquarters of Forest officers.
Load of material, en route for the forest.

Lineman docking a tree for a telephone pole in Big Horn Reserve.

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be made to serve as lookout points from which the smoke from any fire may be quickly detected. The ranger thus provided with facilities for reporting the fire may not only make its presence known, but even in some cases cause a considerable force of men to approach it from the nearest point where they may be found, securing an immense advantage over the transmission of calls for assistance by messengers on foot or mounted on horseback. Although it is conceivable that each man might be equipped with a telephone box adapted to make connection with the line the practical conditions of forest patrol are such as to make it inadvisable for a ranger to be burdened with any unnecessary weight. This makes it desirable to provide call boxes at selected points along the line. It is far more easy for a man to walk a mile or two on the occasion when he does need to use the line than to be day after day weighted with a telephone box, ringer and batteries which will save only a few minutes of time.

Lineman (in upper right-hand corner) stringing telephone line on tree docked for pole.

If for no other reason than the use in connection with fire patrols, the telephone becomes a necessary adjunct to forestry, where there are large tracts of woodland. As the ease with which these forests may be reached by campers and sportsmen is increased, owing to improvements in transportation facilities, it seems to be a regrettable fact that the risk of fire is much increased. This risk will grow larger and larger as time goes on, and it seems desirable to take the most thorough precautions to diminish the danger which is known to exist. The use of the telephone seems to be not only an effective method of promoting such protection, but it is economical and admirably suited to the practical conditions of forestry. It is for these reasons that private holdings no less than public reserves should have their fire lanes, patrol trails and lookout points; they should have call boxes along the trails, and the rangers or patrolmen should be given instructions in the use of the telephone to get direct communication with mills, logging camps or points where a number of men can be had at once. Also by the use of telephone call stations a considerable saving can be made in salaries of patrolmen, because one man with direct telephone communication can effectually cover a much larger area than could be looked after by several men without its aid.

The establishment of a fairly complete network of telephone lines over both the forests subject to government control and those owned by individuals and firms is extremely likely to make losses from fire very low.

Accounting Forms for the Order Wagon

By Scott B. Williams, Auditor, The Texarkana Telephone Company.

KEEPING track of telephones installed, changes made in numbers, rates, etc., and of telephones taken out is a source of annoyance unless a company uses the proper forms for the original orders under which work of this sort is done.

When the writer started in the office of the Texarkana Telephone Company two years ago there was only one form used for the various orders issued to the order wagons, and it was printed on white paper. The use of one form makes mistakes very easy to occur. After using several different forms, the three forms shown in Figs. 1, 2 and 3 were decided upon. Fig. 2 shows the order blank for New Line orders. This form is printed on white paper and, as are the other two forms, printed so that by folding the order back on a perforated line, and slipping a piece of carbon paper between the order end and the stub, both can be written at once, thus saving time. The order is turned over to the city foreman and the stub is kept in the office for reference. The city foreman takes out the order, does the necessary work, and after filling out the "material used" and "labor" columns he signs the order showing date completed on a line provided for that information. The order then goes to the wire chief, who after making the necessary connection, tests, etc., enters the proper facts on his records and sends the order to the chief operator. She tests out the line and after entering the order on her records returns it to the wire chief, who after testing the line once more sends the order to the bookkeeper. After the order reaches the bookkeeper it is entered in the numerical record, street list, and an account opened up in the rental ledger. On the rental ledger, in a blank space, the order number is shown. "In" orders are numbered with an A, following the number. These orders after having been properly completed are filed in numerical files. Later if any information in regard to the installation is desired, reference is made to order No. 1121A for example, upon which may be found the following information on the original order: Date when order was written; subscriber's occupation; where collect account; original cable box, and pair; material used; initials of foreman, lineman, and helper; time put in; date foreman completed work; names of chief operator and wire chief giving O. K.; name of clerk entering order in rental ledger, numerical records, and street lists, and checking same off stub. After a telephone is installed if it is necessary to make a change in name, rate, or in fact any change,

Out Order No..... .....190..

Texarkana Telephone Company,

Biz—Res—Rate.....White-Col. Tel No.....

Name.....

Address.....Ark.-Tex.,

Cable..... Box..... Pair.....

Why taken out.....

If moving where to.....

Where collect unpaid bill.....

Effective.....190....

Ordered out by.....

Entered in Numerical Records, O. K. .....

Entered in Street List, O. K. .....

Entered in Rental Ledger, O. K. .....

LABOR

Foreman.....Hrs.

Helper .....

" .....

O. K.....190..

....

Bookkeeper.

Fig. 1. Form used to record information concerning disconnections, printed in duplicate on pink paper.

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the company uses the "change order blank," which is printed on yellow paper, with guides arranged as shown in Fig. 3. These orders are numbered with a C before the number. If the telephone is ordered out, the necessary data are recorded on a pink order blank (Fig. 1). An O is placed before the number of each of these orders. By glancing at Forms 1 and 3 it is easy for the reader to ascertain what information is necessary to complete either a Change or an Out Order.

AN EFFECT OF COMBINATION.

WHILE his office boy was away on a vacation last week, says *Southern Mills,* Boskins undertook to answer the telephone. He is now firmly convinced that the ways of the telephone girls are past finding out. He had always been treated courteously by the sweet-voiced "hello-girls," but he has come to believe that they were only making game of him.

Boskins had to call No. 2100 several times in the daily course of business. The first day after the office boy had gone he took down the receiver with confidence.

"Give me twenty-one hundred," he said.

"What is it?" asked the girl, in a shocked voice.

"Twenty-one hundred," repeated Boskins, with precision.

"Oh, you want two-one-naught-naught," said the girl kindly, as she gave him the number.

Boskins felt rebuked, and he remembered the correction, storing it away for future reference. "Always say each figure separately," he told himself. "Don't attempt any fancy combinations."

He was in a good humor the next time he called the number.

In Order No..... .....190..

Texarkana Telephone Company,

Sel.

Biz—Res—Rate.....White-Col. Tel. No.....

Name.....

Address.....Ark.-Tex.,

Occupation .....

Where Collect.....

....

Cable..... Box..... Pair.....

MATERIAL USED.

Wire No. 14, Iron.....	Ent. in Num. Record.
Wire No. 12, Iron.....	O. K..... .....
Wire K. K.....	Ent. in Street List.
Wire, Duplex.....	O. K.....
Glass	Ent. in Rental Ledger.
Knobs	O. K.....
Brackets	.....
Poles	....
O. K.....190..	.....Foreman.

LABOR

Foreman .....Hrs.	O. K.....190..
Lineman	.....
"	Chief Operator.
"	O. K.....190..
"	.....
Helper	Wire Chief.
"	O. K.....190..
"	....
Wagon	Bookkeeper.

Fig. 2. Form printed on white paper, in duplicate, used for new installations.

"Give me two-one-naught-naught," he said.

"Two-one-double-naught," said the girl promptly, with the accent on the "double" as though correcting him

Connect. Disconnect.....

Change Name, To new sel. No., Rate.....To Straight Line

Move Order No..... .....190..

Texarkana Telephone Company,

Biz—Res—Rate..... Tel. No.....

Name.....

Address.....

.....

.....

.....

.....

.....

Cable..... Box..... Pair.....

MATERIAL USED.

Wire No. 14, Iron.....	
Wire No. 12, Iron.....	
Wire K. K.....	
Wire, Duplex.....	
Glass.....	
Knobs	
Brackets	
"	
Poles	

LABOR

Foreman.....Hrs.	
Lineman ..... "	
" ..... "	
Helper ..... "	O. K.....190..
" ..... "	....
Wagon ..... "	Bookkeeper.

Fig. 3. Form used by Texarkana Telephone Company for changes of equipment. Printed in duplicate on yellow paper. Size of this and two preceding forms, 4¼ x 8¼ inches.

The next time he called the number he decided to try the new combination. "Two-one-double-naught," he said pleasantly.

"Twenty-one-naught-naught," said the girl, and Boskins retired still more bewildered.

That afternoon he had to call the same number again.

"Twenty-one-naught-naught," he said, and held his breath.

"Twenty-one double-oh," corrected the girl, as she gave him the connection.

Boskins was so confused by that time that he could hardly talk. It worried him all the afternoon. He wished the office boy had not gone away. Then in despair, he took a pencil and figured out that the number could be given in nine different ways. They are:

Twenty-one hundred.
Twenty-one naught-naught.
Twenty-one-double naught.
Twenty-one-oh-oh.
Twenty-one-double-oh.
Two-one-naught-naught.
Two-one-double naught.
Two-one-oh-oh.
Two-one-double-oh.

Boskins studied them all over and hope rose again within him. The next time he approached the telephone it was with an air of confidence.

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"Twenty-one-oh-oh," he said. A smile played about his round face. He wondered how the telephone girl would receive this combination. It was the only one she had not given him. There was a moment's silence after he had spoken the number. Boskins smiled at his own craftiness. This was indeed a Machiavellian triumph.

The girl asked him to repeat the number.

"Twenty-one-oh-oh," said Boskins, like one propounding a riddle.

"Oh you want two-ten-naught," said the girl brightly. Boskins weakly hung up the receiver. He thought about it a long time, and finally decided that it was useless to stake his poor wits against those of the telephone girl.

HOME COMPANY OF LOS ANGELES WILL SPEND $1,000,000 ON EXTENSIVE IMPROVEMENTS.

AT the annual meeting of The Home Telephone Company of Los Angeles, California, there were planned improvements and extensions which will necessitate the expenditure of $1,000,000 in addition to the $4,465,000 that the company now has invested in its equipment.

Two new central offices having an aggregate capacity of 35,000 subscribers are to be installed in Los Angeles, and these are expected to be in operation within a comparatively short time. Arrangements are to be made whereby subscribers of the Home company can communicate with Northern cities over the lines of The United States Long Distance Telephone Company of San Francisco and Oakland.

OUTLINE OF COURSE IN TELEPHONE PRACTICE OFFERED BY Y. M. C. A. OF COLUMBUS, OHIO.

MANY calls for the outline of the course in telephony which began in the Columbus, O., Young Men's Christian Association educational classes, October 1, have been made since the publication in the JOURNAL of the fact that such a course was intended. There is considerable interest in the matter among telephone men in Ohio, and the outline of the course will perhaps be useful in the establishment of similar courses in other schools.

The course will comprise lectures on the elements of electricity and magnetism, experiments demonstrating the points covered in the lectures of both, the history of the magneto telephone, the transmitter, the variable resistance feature, the constant contact transmitters, the receiver; methods of making and testing and a study of the induction coil, primary and secondary currents, and in fact all the parts and functions of the complete instrument.

Subscribers' and switching system will be taken up.

The outline of lesson steps is as follows:

Calling Apparatus—The vibrating bell; the magneto generator; polarized bell; automatic shunt.

The Hook-switch, Its Functions—Simplified telephone circuits both series and bridging.

Telephone Lines—Grounded; common return; metallic; disturbances due to electrostatic and electromagnetic induction and their elimination; the grouping of telephones into systems.

The Switchboard—Boards for grounded and common return lines; switchboards for metallic circuit lines; drops, jacks and plugs, listening and ringing devices; the operators' circuit, lamp signal, multiple, express, common battery types.

Protective Devices—Distributing boards; party lines, selective and non-selective.

Pole Line Construction—Laying out and surveying; framing and setting guying poles; stringing wires.

Underground Construction—The selecting of routes; digging and levelling of trench, laying tile; location and building of manholes; pulling, testing and splicing of cables illustrated.

The Galvanometer and Wheatstone Bridge—The locating and repairing of faults; the Varley and Murray loop tests; capacity and insulation tests.

The Automatic System—The telephone, its various parts, their functions, adjustments, and operations; the wiring and circuit of the telephone; its installation, and troubles to which it is liable.

The Switchboard—The bridging and series systems; calling and talking circuits of the different switches, their functions and operations; the wiring and trunking systems; the flexibility of the system and comparison with the manual system.

The Storage Batteries—Their installation and maintenance.

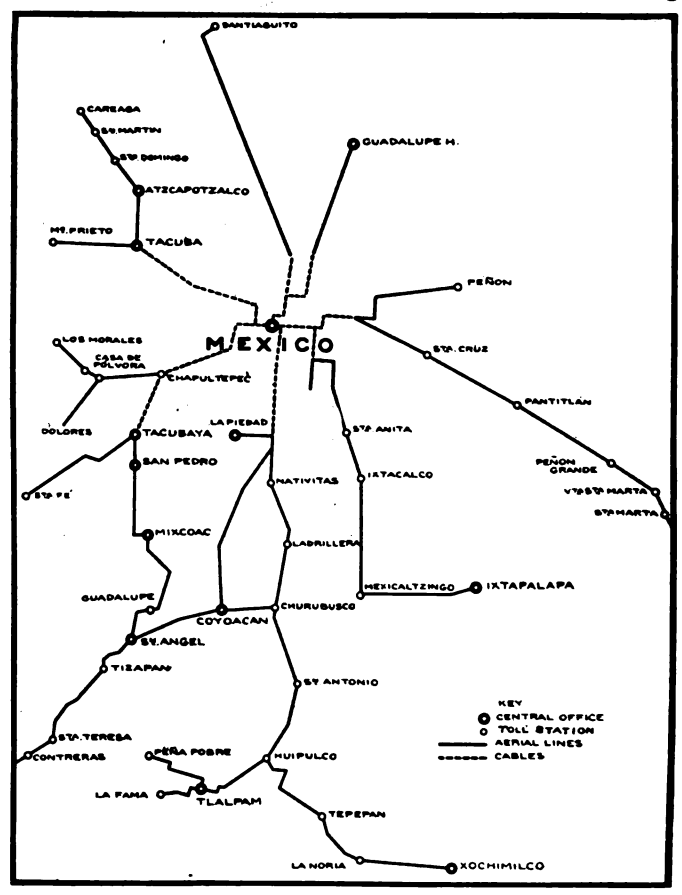
The handling of complaints, the methods of testing and clearing trouble and other like points will be taken up in detail.

The Columbus Citizens' Telephone Company has offered to permit the examination of its entire system to exemplify the instructions, and the use of the switchboard room containing automatic equipment is offered for recitations and study.

EXTENSION OF MEXICO'S INDEPENDENT SYSTEM TO SUBURBS OF CITY.

AS shown by the accompanying map, the Independent telephone company, which has been making such rapid progress in its preparations for giving service to the City of Mexico, is also preparing to reach out widely into the surrounding territory. Lines are being constructed to all the important towns, and in many of these small exchanges are being installed. In others where there is little demand for local connection, owing to the small size of the place, or the slight amount of business to be transacted, the company will simply install a station from which communication may be had with the business houses of the city. As is made clear by the map, lines in cable will be extended beyond the city limits in the direction of the more thickly settled territory, and in other places an adequate system of open wire trunk lines will be built.

Owing to the nature of the soil considerable difficulty was experienced by the Independent company in the installation of its conduit and in preparing the foundation for its central office, but these have now been satisfactorily overcome. Some weeks ago the large multiple switchboard was received at Vera Cruz, and is now being set up. Although the Bell company also is making



Map of Suburban Lines in the Vicinity of the City of Mexico to be Operated by the Independent Telephone Company.

vigorous efforts to get its plant rebuilt by the time the Independent company is ready to give service, the people are anxiously awaiting the opening of the new exchange, realizing that the old company has only made improvements when forced to do so by the near approach of vigorous competition.

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QUERIES

CHATTERING OF TELEGRAPH RELAY IN COMPOSITE SET—(775.)

I should be glad to have you tell me why in a railway composite set it is necessary to furnish ringing current of such high frequency to signal telephone stations. B. J.

In sets of this type, to be used for telephoning on a line also equipped with telegraph instruments, it is necessary that the use of the telephone either for talking or signalling should not interfere with the operation of telegraph instruments. It was found that alternating current of the frequency of that furnished by an ordinary telephone generator readily passes through the telegraph relays, causing them to chatter and interrupting any message which may be in process of transmission.

To overcome this condition the best plan was considered to be to increase the frequency of the telephone signalling current and design a suitable bell to be operated by this high frequency current. The impedance of the telegraph relay to this current of high periodicity is so great that it is completely shunted to the telephone circuit.

TROUBLE WITH COMMUTATOR.—(776.)

The commutator on one of our old charging machines is worn down badly in some places, and the brushes cannot be made to fit well. Is there anything we can do to stop the sparking? R. F.

The best thing you can do, if you have two machines, is to take out the armature and return it to the manufacturers. They will turn down the commutator in a lathe to the cylindrical shape in which it was originally furnished, polish it and return it in first-class condition. If you have not another machine to take the load the manufacturer may be able to furnish you a spare armature to be set in place while your own is being repaired.

It is very important to keep brushes properly set on commutators, and you should pay careful attention to this point after your machine has been repaired. There seems to be a great deal more trouble experienced with the commutators of telephone generators than there is in electric light machines. In most cases this is undoubtedly due to the failure of attendants to understand the necessity for exercising the greatest care in the adjustment of brushes.

MARGINAL RELAYS.—(777.)

Will you please tell me what is meant by the marginal principle in relay design, and give me an example showing how such a relay is used? P. R.

When a circuit is adapted to be connected up at any time to any one of several other circuits and must have definite changes in conditions made to correspond to the particular circuit with

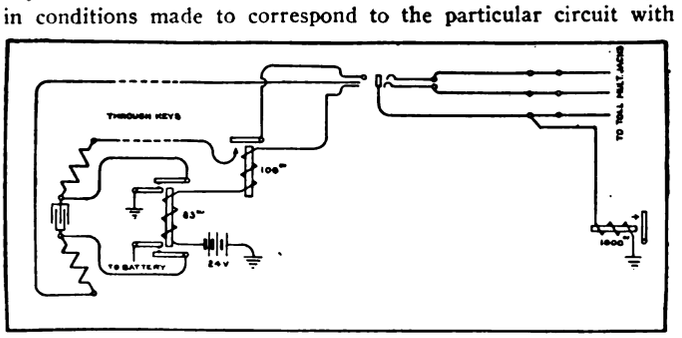

Fig. 777a.

which it is used this result may be sometimes accomplished by the use of a marginal relay. The principle involved is simply the use of a relay so wired as to be brought into series connection with a resistance which in one case will be low enough to permit the passage of sufficient current to energize the relay; while if connected to circuits of the second class the resistance in series with the relay is made so high that the unoperated position will be retained.

A typical example of a group of circuits employing this principle is given in the accompanying diagrams, Figs *777a* and

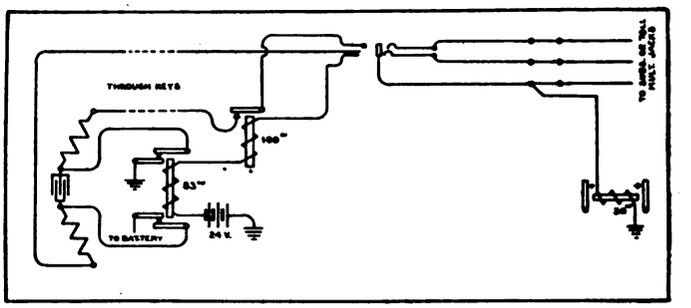

Fig. 777b.

777b. These represent that portion of a cord circuit of a certain type of toll board which includes the marginal relay, and the essential features of the two classes of lines to which this cord circuit may be connected. These are subscribers' lines and toll lines, both of which appear in separate groups of multiples before the toll operator.

When connection is to be made with a subscriber's line it is evident that there must be provided some means of supplying battery for his transmitter, while on the toll lines there should be no battery current. These conditions are fulfilled by connecting in the sleeve circuit of the cord a relay which will be readily operated through a resistance of 30 ohms, this being the resistance between ground and the sleeve of jacks connected to subscribers' lines. The operation of the relay cuts battery across the cord strands, as may be seen from Fig. *777b*. If, on the other hand, the cord is plugged up in the toll multiple the resistance between the sleeve of the jack and ground is 1,000 ohms, and the marginal relay remains unoperated. In this particular case the marginal relay is designed to be operated with a current of .075 amperes and to release on a current of .025 ampere. The current passing through it when connected to a subscriber's line is, by Ohm's law, $\frac{24}{213}$ ampere, $= .113 +$ ampere, well above the minimum operating current. When 1,000 ohms is substituted for 30 ohms in the jack sleeve circuit the current falls to $\frac{24}{1183}$ ampere, $= .020 +$ ampere, which is considerably below what is required to operate the relay.

GENERATOR CUT OUT.—(778.)

Sometimes on our magneto switchboard we are troubled by the loss of ringing power. It goes off very suddenly, and comes on again without our having done anything. The machine runs steadily all the time, and we are unable to see why we should be unable to ring subscribers. B. N.

As you do not state whether the trouble is experienced on grounded or metallic lines we are unable to be sure of its cause. If it is observed when two operators attempt to ring at the same time upon two grounded lines the cause of the trouble should be clear. In this case it is due to a reversal of the leads to the operators' ringing keys, and it will be evident that this will cause each side of the generator to be connected to ground when each of the operators rings on a grounded line at the same time, thus short circuiting the machine. To correct the trouble test out with a buzzer each set of ringing leads, and see that the same side of the generator goes to the same side of keys at all positions.

In order to locate the trouble easily at first it might be well to put up connections from each keyboard with each other keyboard, if you have no buzzer at hand. This should show at once where the fault is.

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THE EDITOR'S PAGE

TELEPHONE CONVERSATION HELD TO BE PUBLIC IN AUSTRIA.

A HIGH court in Vienna, Austria, has just decided that he who talks over the telephone, however secluded he may think himself in a telephone box, carries on a public conversation. The decision was in a suit brought by a telephone girl against a subscriber, who called her a "fresh person." She declared herself publicly wronged in both official and private capacity. The subscriber produced four persons who had listened to the conversation, and who denied emphatically that the words "fresh person" had crossed the offender's lips. The telephone operator then insisted that it was a second conversation in which she was insulted. The suit was carried up through all the courts until the highest declared the subscriber guilty, on the ground that as a telephone conversation might be overheard, the calling of names constituted a public slander.

Moral: Don't call names or tell secrets over the telephone. This is a good moral, even if the courts of this country wouldn't uphold the Vienna law.

FOREST PROTECTION BY TELEPHONE.

INCREASING recognition of the value of the nation's forests to its industries and their general beneficial effect upon climate and water supply is causing people to give more and more attention to their preservation and protection. This work is led with admirable spirit and vigor by the Government Forest Service. This department maintains its headquarters at Washington, but keeps constantly in the field a corps of experts. Some of these men are detailed to assist owners of private forests, teaching economical methods of cutting and other important branches of forestry; others undertake theoretical investigations of subjects connected with the growth and preservation of timber and the like, while the efforts of still a third division of the department are devoted to the practical features arising in the maintenance of the great national reserves.

The telephone recently installed upon some of the reserves has already proved its value in making the isolation of the camps of rangers entrusted with the care of these large tracts more endurable. Useful as this feature is, even more so is the fact that actual experience seems to be demonstrating the value of the telephone as an aid to the fighting of fire. When hands are few, for those which are available to come quickly to the scene of action is to greatly multiply their effectiveness. The discoverer of a fire may summon aid and immediately devote his entire strength to overcoming the progress of the flames at the beginning, working with the comforting knowledge of the hour when assistance or relief will be brought to him.

As pointed out in the article dealing with this method of protection, which appears upon other pages, the cost of such a forest line as is required is comparatively low, in spite of the comparative inaccessibility of portions of the right of way. Their installation, therefore, seems to be likely to be much extended. Due to private enterprise, there are in a number of parts of the country telephones installed at lookout stations on high ground, from which notice is sent out as soon as smoke is observed. The saving of a single tract of very moderate size is enough to pay for a telephone line. In view of the ratio of the amount of land burned each year to the total forest area it would seem that the probability that the telephone would have a chance to prove its worth is a great deal more than high enough to warrant the expense of line building. There is little doubt that before many years not only the government reserves but nearly all of the most valuable privately owned timber tracts will have their protecting telephone systems.

SPEEDING POLITICS BY TELEPHONE.

WHIRLWIND political campaigns would lose half their vigor without the telephone. In an article on the methods of conducting the various steps necessary to impress upon the public mind the merits of a candidate and "get out the vote" the New York *Evening Post* gives the telephone credit for revolutionizing the old ideas. Its increased use has, of course, been the means of facilitating prompt and united action in all parts of a district. It has brought about, too, a centralization of power along with increased speed of action and cohesiveness of organization. One man can now manage the campaign of an entire city, and what is more, he can do this without leaving his office. District managers, with power and responsibility vested in them far less than in the old order of things, receive their instructions over the telephone line. Their work is a part of the plan of the chief, and he is able to watch its progress closely, even from hour to hour.

Canvasses of business men may be made by the use of the telephone in a few hours, where in the old days it was necessary to employ a force of men for several days to visit the various houses. Now the business is closed in a few seconds of conversation over the wire from headquarters. There is less cost to the campaign managers and less annoyance to the business men. It is the same with signatures for some call to be issued—all preliminary steps are settled from headquarters without delay.

Last year in the headquarters of one of the busiest fighters for office in New York City one of the first steps in carrying on the operations was the installation of telephone instruments by the use of which every district in the county could be reached instantly. In Philadelphia, too, the winning party expressed their satisfaction with the value of this speedy method of communication.

There is no questioning the fact that speed and unity of action are two of the prime qualities of a successful political campaign, and these things may be obtained in the fullest amount only by the use of the telephone.

HUNTING FOR COMPLAINTS.

RATHER amusing, but yet worthy of some serious thought, was the retort made in a certain city a few days ago when a telephone company published a statement showing how much the number of complaints had diminished. "No use to kick, for no heed is paid to complaints," is the way the situation was summed up.

Of course the greater number of complaints are not due to general faults. Rather do they come from subscribers after some single experience with a connection which was particularly troublesome. It is this fact that makes the careful handling of complaints by the telephone company an expensive process which has a comparatively slight power to bring about any distinct effect in lifting up the service.

With the realization that telephone companies are in business to sell service, which line of thought, strange to say, has only been developed since the introduction of the element of competition, the tendency to investigate the opinion of the purchaser is increasing. It makes no difference how much time may be put into supervision, nor how many aggregate minutes may be saved to the business men through the reduction of the time of answer by a fraction of a second, if these men are not convinced that they are getting the very best attention that it is possible to give them.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

RIGHT OF TENANT TO PREVENT SETTING OF POLES.

In extending our line we have run up against a formidable obstacle in the shape of a woman armed with a shotgun. She is holding the fort against our attempting to set poles in front of her house. Two or three attempts on the part of the employes of the company have been frustrated by the evident determination of the lady, and the aid of the sheriff is to be invoked.

The woman is only a tenant of the property and it seems to us that this alone would deprive her of any right to prevent our setting poles. Will you please give us your opinion on this point, although we expect the matter will be settled before we can hear from you. A. M. E.

IT is the opinion of the legal editor that the fact of your opponent being a tenant does not in any way interfere with her right, if any, to hinder your work. A tenant has the right to full possession of the property during the tenancy and becomes the successor to all the rights of the landlord, so far as outside persons are concerned. If the landowner is entitled to prevent you from erecting poles in front of his property, the tenant may do the same.

PLACING GROUND RODS ON POLES.

Please advise me if you have any decision from any Court whether a Board of Aldermen for a town has a right to order a company to place ground rods on its poles. The theory of the board is to protect the property in the near neighborhood of poles from lightning. H. S.

WE have no decision from any court upon this particular point. As a general principle the Board of Aldermen of a town has the right to pass reasonable police regulations for the government of telephone companies, and under this principle would have a right to make the order in question, providing it was a reasonable regulation. The regulation does not seem reasonable because there is practically no danger from lightning to property close to poles. The question would in each case be one for the local courts to decide whether the regulation was reasonable.

DELEGATION OF RIGHT OF EMINENT DOMAIN.

By the statutes of our State we are given the right to condemn rights of way for our telephone lines, the right of eminent domain I believe you call it, in legal terms. This right is given to us in the law organizing telephone companies. We wish to lease our line to a private person for a term of years and want to know whether he can exercise the same power in this respect that we have. A prompt answer will very much obilge,

M. D.

IT has been held that the lessee of a telegraph company cannot exercise a right of eminent domain conferred on its lessor, since the right of eminent domain cannot be delegated. Western Union Telegraph Company vs. Pennsylvania Railroad Company, 255 S. Ct. 150. You might be able to avoid the effect of this rule by having your proposed lessee organize a corporation under the same act under which your company is organized and then make the lease to the new corporation. The new corporation would have the same right you have by virtue of its incorporation and could then condemn rights of way for its own purposes, or to continue the operation of your line.

EXPANSION OF BELL COMPANY ENJOINED AT NILES, MICHIGAN.

THE influence which persistent resistance may have in molding public opinion and producing action upon the part of municipal authorities had a good illustration the other day at Niles, Mich., where the Bell Telephone Company was placing poles and stringing wires in the limits of the city without authority. The company had commenced digging holes at the corner of Sherman and Ward streets when a number of citizens protested, but the work was continued. A member of the city council was notified and went to investigate, but without producing any results. Then the women took a hand. A hole six feet deep had been dug on the property of Mrs. Evan Evans. After repeated efforts on her part to have the men leave in peace, she jumped into the hole, while the attention of the foreman was called in another direction, and remained there until the men became discouraged and left. A Mrs. Clark covered a three-foot hole with a plank and sat on it until the crew decided to leave. When the actions of the women were reported to the president of the council he immediately called a special session at which the city solicitor was directed to secure an injunction against the telephone company, which was accordingly done.

REDRESS FOR EXCESSIVE CHARGES IS IN CHANCERY COURT.

AT Chicago, Ill., Judge Jesse Holdom denied the motion for a new trial in the case of the Illinois Glass Company, which sued for the refunding of $250 excess charges by the Chicago Telephone Company. At the trial several months ago, the right to recover was based on the doctrine of duress and Judge Holdom at that time held there had been no duress. The court reviewed the matter at some length on the argument of the motion, and concluded that plaintiff must seek redress in a chancery court and not a court of law. Other similar cases brought by the Illinois Manufacturers' Association are now pending.

FRANCHISE OF INDEPENDENT COMPANY AT ALBANY, OREGON, GOOD.

THE suit over the Home Telephone Company's franchise to install its system in Albany, Oregon, is to be carried to the Supreme Court of the state. Some time ago the Pacific States Company, which covered the field at Albany exclusively until the advent of the Home Company, began an injunction suit to prevent its rival from operating. It claimed that its franchise was faulty, but the court ruled in favor of the Home Company. Notice of appeal from this decision has been filed in the county clerk's office. Meanwhile the new company has been at work installing its system.

LINEMAN WHO MADE A SHORT CIRCUIT HELD CONTRIBUTORILY NEGLIGENT.

A LINEMAN in the service of an electric company was directed to put a cross arm on one of its poles, close beside which stood a pole of another company. The lineman went up the pole of the company by which he was not employed, and when at the top stood with one foot near the wire of the other company. While standing in this way, in passing a rope, he threw his hand up and into contact with a wire belonging to a telegraph company and ordinarily carrying only a small amount of electricity, which was insufficient to hurt anyone. He immediately received a severe shock of electricity and fell to the ground painfully injured. He brought suit against three electric companies, but was not permitted to recover from any of them. The court held that the most reasonable theory of the accident was that plaintiff's foot was on a heavily charged wire of one of the electric companies and when he touched the other wire he completed the circuit. It decided that he knew the danger of making a short circuit and the jury was right in bringing a verdict for the defendants. Martin v. Citizens' General Electric Co., 92 S. W. 547.

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IN THE OPERATING FIELD

UNIFORM RATES FOR SERVICE WITHIN COUNTY BORDERS FIXED BY MISSISSIPPI RAILWAY COMMISSION.

ENFORCEMENT of the order which was issued by the Mississippi Railway Commission last July, providing for free conversation between all telephone stations in the same county on payment of a prescribed maximum rate has created a great deal of interest in this matter. The text of the rule is as follows:

"In any county in this state where there may be one or more telephone exchanges, same shall on the request of the patrons and subscribers be connected so that the subscribers in each may have connection and service from all exchanges and telephones in such county upon the following terms: Any subscriber who desires free service to all exchanges and with all subscribers in their respective counties, other than the local exchange with which he has connection, may secure same by paying the published monthly rental which might be demanded by an exchange where the number of telephones in use equalled the total number of telephones in use at all exchanges in such county as follows:

"Where the total number of telephones in said county is less than 600, the monthly rental of all desiring free service in said county may be not more than:

Business, direct line	$2.75
Business, two party line	2.00
Residence, direct line	1.65
Residence, two party line	1.40

"Where the total number of telephones exceeds 600 but not 1,000, the rates may be not more than:

Business, direct line	$3.50
Business, two party line	2.50
Residence, direct line	2.00
Residence, two party line	1.50

"Where the total number of telephones exceeds 1,000 but not 2,000, the rates may be not more than:

Business, direct line	$4.00
Business, two party line	3.00
Residence, direct line	2.50
Residence, two party line	2.00

"All subscribers who do not request and desire such free service and county connection shall be charged only the rates authorized by this commission and now in force for local service, and for long distance, such toll rates as are approved by this commission."

DID HE GET THE JOB?

LAST June the president of one of our largest telephone manufacturing companies received the following letter:

My dear Sir:

Would you not like to engage the services of a young man who is honest and energetic, capable and competent—one in whom you could place utter confidence, and one to whose care and direction you could soon entrust the highest and most important department of your establishment?

To-day, I graduate from the La Grange High School, and stand ready to answer the call of any reliable electrical engineer, telephone or electric light company that desires my services.

I have zealously studied the science of electricity in many of its phases and, in my summer vacations, have done much toward applying my knowledge to practical work. I am thoroughly familiar with the principle of the telephone and telephone switchboard, and have done a great deal of work for systems that use the supplies of the —— Mfg. Company.

In the past three years of my high school work, while my classmates, my intimate friends, have been enjoying the passing pleasures of gay society, I, in the quiet repose of the study room, have been laying the foundation for a higher education—an education that will gently guide me across the rugged cliffs that obstruct the bright pathway that leads to electrical engineering success—an education that will make me a man among men—a master electrical engineer. I have been reared in a cultured, Christian family and, in spite of the temptations of society, have given my time to the things that go to make up an ideal man.

Will you not give me a position in your factory? If you will, I will show my appreciation by making for you an efficient and trustworthy man.

Please let me hear from you.

Very respectfully,

Hapgoods, the expert employment brokers, claim that a letter of this sort should, above everything else, be so composed as to strike the attention of the man who receives it. That is probably what the young man had in mind when he produced this unique creation.

MONTANA INDEPENDENT TELEPHONE COMPANY TO HAVE NEW BUILDING AND EQUIPMENT IN BUTTE.

THE Montana Independent Telephone Company is exhibiting signs of activity all along the line to an extent that bids fair to result in a new and modern telephone system for Montana at no very distant date. A building site for the new exchange building in Butte has been secured consisting of a 63-foot frontage, upon which will be erected a central office building.

In design the building will be treated in colonial style, the portico across the front will be supported with massive stone columns of the Ionic order and the entablature above will have a molded stone architrave and frieze. The cut stone used in the building will be a very handsome bluestone. An impressive feature of the building is the Independent shield, carved in stone, appearing in the centre of the pediment.

In construction the building will be absolutely fireproof, reinforced concrete being used throughout, and all windows and doors will have metal frames and will be glazed with polished wire glass, with the exception of the glass in the front, which will be plate. The front room on the first floor, which will be the general office of the company, will be finished throughout with tile floor, verd-antique marble base, quarter-sawed oak wainscoting door and window trussings. The ceiling, which will be the leading feature of this room from an artistic point of view, will have heavy recessed molded panels and ornamental stucco corbels and cornice, all of which will be very handsomely decorated.

The toll booths for the long distance service will be located in the lobby of the general office. In the rear portion of the first floor will be located the main terminal rack, the battery room, the power machine and the wire chief's desk. On the second floor will be located the main switchboard and the toll switchboard. Also a large front room which will be used as a recreation room for the operators when off duty. A locker room of ample size and toilet rooms are also provided on this floor. In the basement, which will be very well lighted, will be located the construction department, the cable vaults and linemen's room. The importance of convenient arrangement has been kept steadily in mind in planning the building throughout; the construction will be of the highest order and the architectural effect will be imposing and in keeping with the enterprise and the excellence of the service which the company will render its subscribers.

The capacity of the switchboard to be installed will be sufficient to serve a city of 150,000 people. The same far-sighted

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policy will govern the installation of the underground conduit system. Through these underground ducts all subscribers will be served within the territory bounded by Montana, Copper, Arizona and Mercury streets, and all distributing poles and wires will be located in the alleys, so that no additions will be made to the present tangle of overhead wires in the streets. Not one open wire will cross over or enter a street in the above-mentoined district.

AN EXAMPLE OF EXCELLENT INDEPENDENT DEVELOPMENT IN AN INDIANA TOWN.

LIKE many other successful enterprises the Franklin Telephone Company of Franklin, Indiana, has grown from a very humble beginning to a substantial business. The Bell Telephone Company had held a franchise in Franklin for fifteen years previous to 1896, the date of the establishment of the new company, but had made no effort whatever to establish or maintain a local system, and when in August of 1896 Mr. Strickler, the present manager, applied to the Franklin council for a franchise to permit him to establish a local telephone system, the Bell company had but three telephones in the entire city. When Mr. Strickler applied for the franchise he had applications for twenty-seven telephones, which fact shows that the Bell company had neglected its opportunity, for the time was ripe for the founding of a new system.

The franchise was granted and Mr. Strickler immediately began the construction of an exchange. The local system now has 1,035 patrons and by the free county service which has been obtained, a patron of the Franklin Telephone Company is able to reach 2,564 patrons throughout the county free of cost.

The company now owns and occupies its own three-story exchange building with offices on the first floor; switchboard room, operator's rest room, cable room and supply room on second floor; basement under the entire building being used for storage room for heavy supplies. There are some ten or twelve blocks of underground conduits carrying cable for present uses, ample capacity having been arranged in extra conduits. The utmost satisfaction with its service is expressed by all its subscribers.

AUBURN, N. Y., SUBWAY ALLEGED TO BE INADEQUATE.

SUMMONS and complaint in an action brought by the Empire State Telephone & Telegraph Company against the city of Auburn, N. Y., the park commissioner and other officials to recover a judgment for $5,000 for the cutting of wires in the city has been filed in the county clerk's office. An injunction granted by Justice Dunwell restraining the park commissioner from interfering with the wires and a bond of $500 to pay costs were also filed.

The city cut the wires of the company because they were not placed in the subway as ordered, but the plaintiff alleges that the reason that its wires were not placed in the subway was that the subway was not so constructed as to enable said plaintiff to serve customers therefrom, having neither distributing poles nor subway openings requisite for such service, and that the plaintiff was unable to obtain the consent of Water Street property owners for permission to erect distributing poles.

DETROIT INDEPENDENT COMPANY HAS MILLION FEET OF CONDUIT LAID.

THE Home Telephone Company, of Detroit, has purchased for the site of its central exchange property at the northwest corner of Madison avenue and John R. street, a site 105 feet on Madison and 100 feet on John R. street. The detailed plans and specifications contemplate a building to cover the entire lot, three stories, and devoted entirely to local and long distance telephony. It is expected to have this building ready for occupancy by May 15, 1907.

The offices of general manager and engineer and the board room are to be on the first floor, while the second floor is to be devoted to the long distance board, hospital, rest room and lockers for the operators, and also the terminals, battery room and office of the long distance wire chief. The third floor is for the switchboard exclusively. Under the building is a large basement for shops, storage purposes, etc. The exterior is very attractive in cut stone and fancy brick. Construction work has been actively under way since July 16, and nearly a million feet of the subway is already in the ground and a great many of the terminal poles in the central exchange district have been set.

It is expected that the plant will be ready for operation some time during the summer of 1907. The plans for underground work, etc., are being laid out for a capacity of 30,000 telephones.

The plant is being built by the Electric Construction Company, of St. Louis, Mo. The work of building the big plant is being done by the construction company without a cent of profit, it being controlled by the same interests as those which are the principal owners of the telephone company. The officers of the Electric Construction Company are Max Koehler, of St. Louis, president; Sam. B. Jeffries, of St. Louis, treasurer; W. B. Woodbury, of Detroit, general manager, and W. C. Polk, of Birmingham, Ala., chief engineer. Charles H. Ledlie, of St. Louis, is consulting engineer for the telephone company, and his representative on the ground is Joseph Lillich, of St. Louis.

The Commonwealth Trust Company, of St. Louis, is financing the proposition, and its representative on the ground is W. W. Grayson, formerly of the Kinloch Telephone Company.

ILLINOIS MANUFACTURERS' ASSOCIATION SUBMITS ORDINANCE TO CITY OF CHICAGO.

IN Chicago the Illinois Manufacturers' Association has submitted to the city council the terms of a new ordinance under which the association is prepared to construct and operate a telephone system. The terms of the ordinance are as follows:

Franchise for thirty years, with option of purchase by the city at the end of twenty years.

Mayor and commissioner of public works to be ex-officio members of the board of directors.

Books of company open at all times to inspection of city controller.

All wires underground in district bounded by Belmont avenue, Western avenue as far south as Twenty-second, thence east on Twenty-second to Halsted, south on Halsted to Fifty-fifth street, and east to Lake Michigan.

Illinois Tunnels conduits to be used when necessary.

Manufacturers' association promises to have 25,000 telephones in service before January 1, 1909—the date of expiration of present franchise—and 50,000 telephones by January 1, 1910, on penalty of forfeiture of $50,000.

Free service to city, except the police department, which pays an annual rent of $1.50 a year for each combined receiver and transmitter.

One-fourth of net profits go to city as compensation.

If the city decides to purchase at the end of twenty years it will pay in cash the cost of duplicating the property, plus 5 per cent. additional as compensation for the compulsory sale, but shall not pay anything for earning power or franchise value.

A penal sum of $100,000 to be put up by the company to cover failure to carry out any provision of the ordinance.

The rates are to be as follows:

	A year.	Total outgoing calls a year inc.
Business, direct line, unlimited service	$90	.....
Business, 2 party line, unlimited service	60	.....
Business, direct line, measured service	50	1,000
Business, 2 party line, measured service	35	700
Business, 4 party line, measured service	25	500
Extension sets on business lines, unlimited, each	12	.....
Extension sets on business lines, measured service, each	5	.....
Residence, direct line, unlimited service	60	.....
Residence, 2 party line, unlimited service	45	.....
Residence, 4 party line, unlimited service	30	.....
Residence, direct line, measured service	30	600
Residence, 2 party line, measured service	20	400
Residence, 4 party line, measured service	15	300
Extension sets on unlimited residence lines, each	10	.....
Extension sets on measured residence lines, each	5	.....

Those in favor of granting a franchise to the new company claim that the Chicago Telephone Company has violated its agreements and forced the city into litigation, and that it is not entitled to a renewal of its franchise. John M. Glenn, secretary of the Manufacturers' Association, states that if the franchise is secured the Manufacturers' Association will spend from $12,000,000 to $15,000,000 at once.

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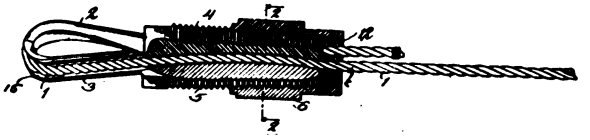
TELEPHONE PATENTS

WIRE CABLE CLAMP.

John H. Cook, New York, N. Y., patents (No. 830,134; dated Sept. 4, 1906; filed May 7, 1904; serial No. 206,932) and assigns to Henry B. Newhall, Plainfield, N. J., a wire-cable clamp.

Fig. 1.



The clamp is made of two sections which fit together. Each section or half has grooves or threads which are intended to receive a nut which forces the two sections of the clamp together, thus holding the cable which is between them firmly in place.

Fig. 3.

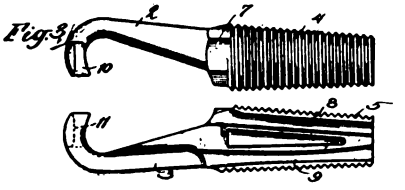
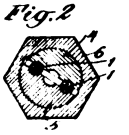


Fig. 2.



Hooks, one on either section, register when clamps are put together, forming an eye.

ANTISEPTIC TELEPHONE MOUTHPIECE ATTACHMENT.

George Washington Merritt, San Francisco, Cal., patents (No. 821,948; dated May 29, 1906; filed March 28, 1905; serial number 252,462) antiseptic telephone mouthpiece attachment.

This invention relates to a shield which shall provide a "simple, cheap, handy, individual mouth protective, germ-destroying device." The device consists of a perforated diaphragm plate of suitable metal, which may be at any time attached to or detached from the mouthpiece of any transmitter which the owner of the attachment desires to use.

THERMAL PROTECTOR.

Frank B. Cook, Chicago, Ill., patents (No. 815,006; dated March 13, 1906; filed December 18, 1902; serial No. 135,677) a thermal protector and alarm.

Fig. 1.

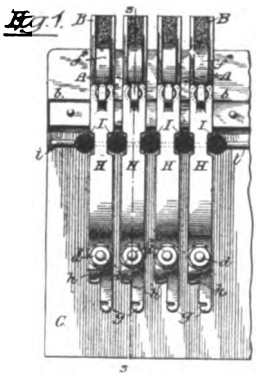
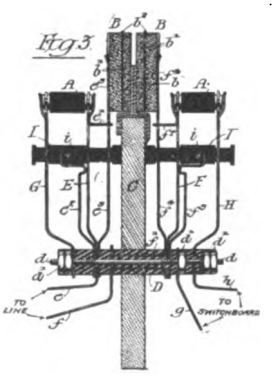


Fig. 3.

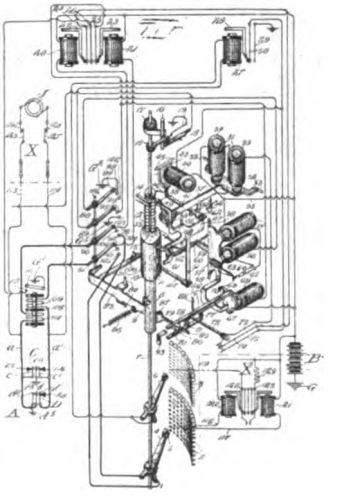


The inventor provides a protective device which is composed of a number of units designed to be mounted on a metal bar or plate C shown in Fig. 1. In Fig. 3 is shown a section of the apparatus on the line 3-3 of Fig. 1. The line terminals *e* and *f* are connected to the springs e^3 and f^4, while the switchboard terminals are connected to the springs *G* and *H*. Any abnormally strong current will heat the coils A and the springs e^1 and f^2 will come in contact with the plate C, thus grounding the line. At the same time an alarm circuit is closed through the springs e^3 and f^4, which actuates a signal and gives notice that the device requires attention. The protector may be reset by replacing the heat coils after they have cooled.

AUTOMATIC TELEPHONE SYSTEM.

John Erickson, Chicago, Ill., patents (No. 831,846; dated Sept. 25, 1906; filed Dec. 30, 1904; serial No. 238,904) and assigns to the Automatic Electric Company, Chicago, Ill., an improvement in automatic telephone systems.

The object of the inventor is to provide means for preventing the two line relays which are normally bridged across the subscriber's line from being operated when the subscriber is being called, without the necessity of breaking the circuit in which the relays are bridged or of cutting them out. The called subscriber's station is shown at A. The two line relays 20 and 21 are shown at B. To prevent these relays from being operated when the subscriber is being called, a differential relay 108 is provided, whose armature 111 is connected to ground G' and



when attracted engages with the contact point 112, the latter being directly connected with the line relay ground spring 26. With this arrangement neither the vertical nor the private magnets can be operated until the relay 108 is energized and the connection thereby closed from the spring 26 to the ground G'. This of course will take place whenever the subscriber at substation A grounds either or both of the line conductors leading from the station, as a flow of current through these two windings when in multiple or through one winding only will magnetize the core of the magnet 108.

VISUAL SIGNAL RECEIVING SYSTEM.

Ernest A. Faller, New York, N. Y., patents (No. 822,888; dated June 5, 1906; filed July 28, 1903; serial No. 167,311) a visual signal receiving system.

This invention relates to a visual signal receiving system, such as may be used in telephone systems, but more particularly in semi-automatic telephone systems, such as those described in the inventor's previous patent No. 757,031. The object of this invention is to simplify the work of telephone exchanges by

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eliminating all but the simplest functions of the operator. As the operation of this system is somewhat complicated, and the drawings are numerous, and must be referred to in order to obtain a proper idea of the working of the system, the space available in our columns is insufficient to describe completely the working of the device. Therefore we suggest that any one interested procure a copy of the patent.

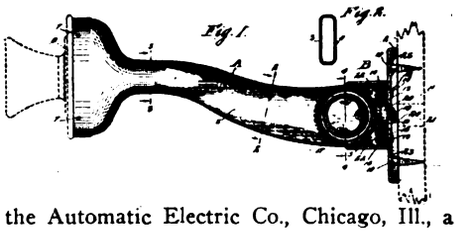
SWITCHBOARD JACK MARKING DEVICE.

Alexander M. Haubrich, Chicago, Ill., patents (No. 828,848, dated Aug. 14, 1906; filed April 1, 1904; serial No. 201,030) and assigns to the Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., a telephone switchboard.

To obviate the necessity of repeatedly making a busy or trouble test on a line which is out of service owing to the presence of trouble, or some other reason, the inventor provides holes above each jack designed to receive pins with colored heads. The color of the pin would have an arbitrary significance and would indicate at all times the condition of the line.

TRANSMITTER ARM.

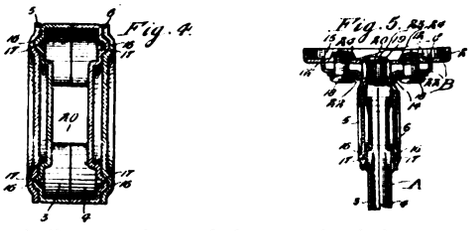
Harry J. Guttman, Chicago, Ill., patents (No. 831,855; dated Sept. 25, 1906; filed November 25, 1905; serial No. 289,047) and



assigns to the Automatic Electric Co., Chicago, Ill., a telephone transmitter-arm.

The arm is composed of two hollow halves or sections of sheet iron put together to form a tube of the shape shown in the sectional drawing, Fig. 2. These sections are held together at the pivot end by the corrugated base clips which, with the special formation of the arm at this point make a frictional bearing which retains the arm in any desired position. The two bolts 18 which secure the clips to the base, when tightened cause the clips to press against the arm holding it more firmly. Its rotative motion is limited by the clips 14, which are engaged by the boss 19 formed at the extreme rear end of the arm.

At the transmitter end of the arm the two sections of the arm are expanded to form a case for the transmitter, the latter being held in place by screws through holes 7, which also aid in re-



taining the hollow portions of the arm in their proper position. Conducting leads or cords may be carried to the transmitter through the interior of the arm.

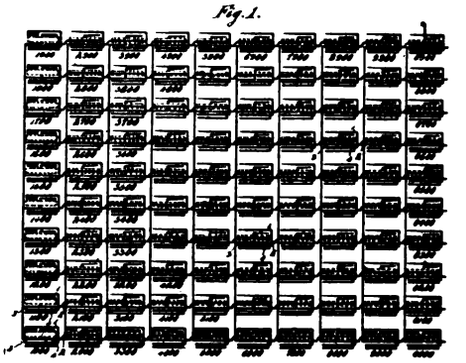
CALL SYSTEM.

William J. McCollom, Paterson, N. J., patents (No. 828,235; dated Aug. 7, 1906; filed February 24, 1906; serial No. 302,820) and assigns one-third to F. Eliot Low, Paterson, N. J., a call system.

This system is of a type intended to be used in mills, factories or in any other place where one or several persons such as the superintendent, manager, etc., move about from one part of the building to another, and who are to be called to the telephone by a particular signal. The sub-stations are of ordinary type and are not intended to be connected together, but for communication with the central office. The instrument at the central station is provided with several sets of contacts mounted on a suitable base and intended to be rotated by the operator. A number of push buttons are mounted on the instrument and each of these is mechanically connected with the rotating mechanism so as to cause a particular number of impulses to be sent over the line to all sub-stations, simultaneously, when it is pressed.

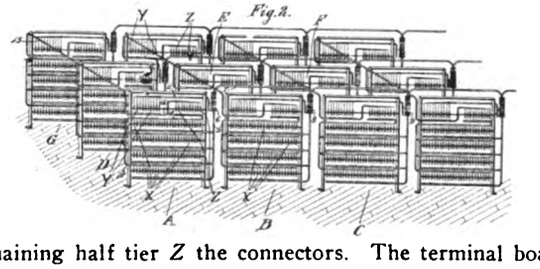
ARRANGEMENT FOR AUTOMATIC EXCHANGE CABLING.

Alexander E. Keith, Chicago, Ill., patents (No. 831,876; dated Sept. 25, 1906; filed March 9, 1905; serial No. 249,189) and assigns to the Automatic Electric Company, Chicago, Ill., a switching or telephone system.



The invention covers a method of arrangement of wiring in telephone exchanges, and more particularly in automatic exchanges. The inventor claims that with the arrangement of wiring provided the load is equalized, or evenly distributed between the different trunking switches in the exchange and that trouble may be more readily located; also that additions may be made without interfering with apparatus already in use.

The first selectors, second selectors and connectors for a given set of lines are all mounted on the same board. The arrangement of the different boards, each of which contains the apparatus for 100 lines, is shown in Fig 1, which is a conventionalized floor plan of a 10,000 subscriber exchange. The inventor lays great stress on the method of numbering shown in Fig. 1. It will be seen that the switchframes are here arranged in rows of ten from bottom to top of the figure and also in rows of ten from left to right. Each of the rows extending from top to bottom represents a certain thousand in the exchange. It is evident that each of the rows extending horizontally from left to right contains the first selectors representing the same hundred. The cabling also is roughly shown in Fig. 1. Referring to Fig. 2, a small exchange or a portion of the large exchange is shown in perspective. On the switching frame the four lower tiers *X* are first selectors; the half tier *Y* second selectors, and



the remaining half tier *Z* the connectors. The terminal board 6 is shown at the right, and the cabling between the various boards is indicated.

LOCK-OUT SYSTEM.

Charles A. Bucklin, New York, N. Y., patents (No. 828,271; dated Aug. 7, 1906; filed July 3, 1903; serial No. 164,159) and assigns to Barbara J. Francis, New York, N. Y., a telephone apparatus.

The inventor provides for a lock-out system in which all the stations on the line except the one in use are intended to be locked out by the operator at the central station. At the substations a receiver hook latch is employed in connection with three specially designed relays. Selective ringing is used to get the desired station before locking out. After the subscriber has answered the operator sends a pulsating current over the line to operate the lockout devices

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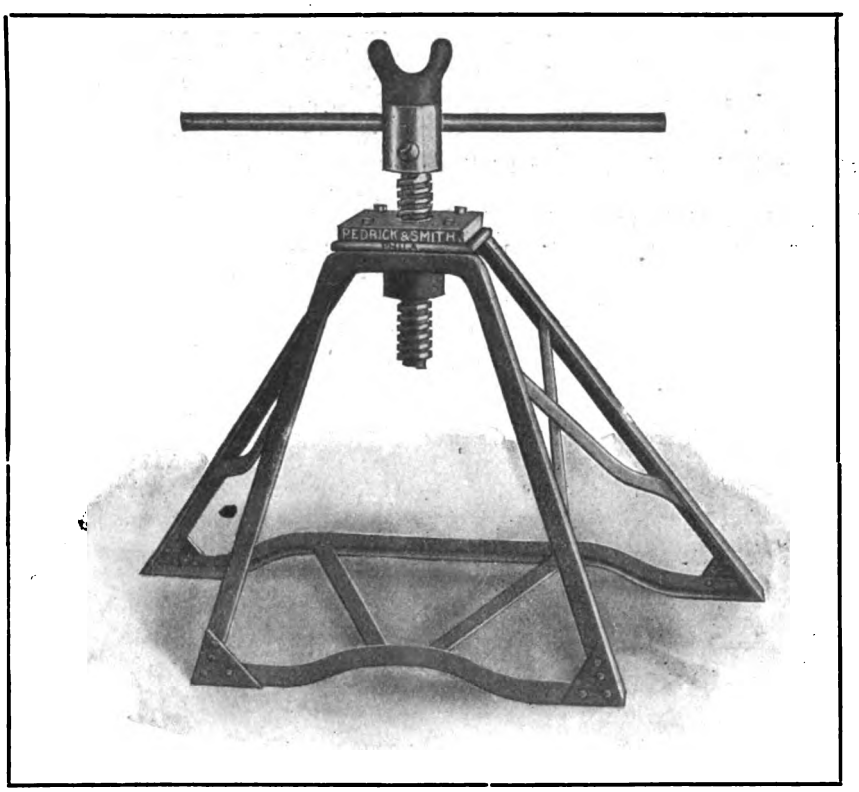
IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

A CAPSTAN CABLE JACK.

STRENGTH, combined with lightness and portability, seem to be the features of a device for supporting cable drums which are most appreciated by practical construction men. Pedrick & Smith, Germantown, Philadelphia, Pa., with these requirements in mind, have produced the device illustrated upon this page. It is built up of steel angles, strongly braced to stand all the strains which are likely to be imposed upon it by a heavy revolving drum. These jack supports are used in pairs, one each side of the drum which they support. On the face of the jack which is to be set next to the drum (the one with the short base) there is very little slant, so that the jack may be brought very close to the drum. The amount which the base projects beyond the top is only 1½ inches. This feature is extremely valuable, as it not only saves space, but allows the drum to revolve upon a short axle, thus gaining strength. The spread of this side of the base of the jack, in the direction taken by the cable in passing off the reel, is 14 inches. The supporting feature in the jack lies in its outer frame work. This slants outward from the upper portion, so that its base is 5½ inches farther from the drum than is the top. Its spread lengthwise is 36 inches, this being sufficient to prevent the slightest danger of its toppling over in any direction. It is said that experience has shown that the heaviest drums revolve smoothly on these jacks, there being not the slightest perceptible vibration or tilting, as the weight is evenly distributed.

As the screw is of large diameter and heavy pitch the drum, when once put on the standards, may be quickly elevated to the desired position with little effort. The weight is only 60 pounds. Further information and prices can be obtained by writing to the company.



Jack for Supporting Cable Drums, Made by Pedrick & Smith.

THE A. H. ANDREWS COMPANY, 174-176 Wabash avenue, Chicago, Ill., in its new catalogue of metal furniture shows an attractive type of steel frame operator's chair. It is a substantially built revolving chair, adjustable for height, and having an adjustable straight spring back rest, and a foot rest. The frame work is made of the best Bessemer steel, with rods twisted and interwoven.

RICHARD WADE, SONS & COMPANY, LTD., Hull, England, have prepared an extremely attractive and interesting catalogue describing their yards for the manufacture of telephone and telegraph poles, etc. This company furnishes to customers in England a very large number of creosoted poles, and views are given which show the method of preparing them, and some typical lines in the construction of which these treated poles have been used.

THE EDWARDS-HINE COMPANY, 5-7 Pearl street, Grand Rapids, Mich., has recently issued a booklet describing the Proudfit loose-leaf binder. This binder is an exceedingly useful development of the loose leaf principle, as it actually has the action of an ordinary permanently bound blank book. This action is secured through special details of construction embodied in the framework of the binder, but these are so concealed that when filled with leaves the book resembles, not merely in action, but also in appearance, a permanently bound book with a cover of the most substantial type. The details of construction, and the advantages which can be secured by the use of such a book are fully explained in the company's descriptive booklet, which may be obtained upon request.

THE FRANKEL DISPLAY FIXTURE COMPANY, 740-742 Broadway, New York, U. S. A., reports that many telephone companies are buying large numbers of the Frankel electric testing clip to distribute among troublemen and instrument setters. These clips, when attached to cords used in connection with testing telephones or instruments, furnish a means of making a quick connection to telephone circuits, and also insure a solid contact. The strength of the spring in these clips is sufficient to cause them to hold tightly, so there is no danger of their being accidentally pulled off, to the possible annoyance of the user. The company will send full information to all interested persons.

THE DEAN ELECTRIC CO., Elyria, O., has recently issued a new bulletin, No. 103, dealing with portable desk telephones. The descriptive matter and illustrations are, as is usual in the publications of this company, exceptionally well prepared, and convey a clear and complete idea of the various pieces of apparatus to which they refer. Wiring diagrams for the different instrument-circuits used by the company are shown. Other pieces of apparatus described are extension bells of several types, and a neatly designed push button key, which may be mounted in Dean desk stands for various special uses when specified with an order.

THE BAIRD MANUFACTURING COMPANY, 1506 Briar Place, Chicago, Ill., has brought out a new counter for use in taking peg counts at switchboards. It can be set back to zero at any time, and the company claims that it will not advance more than one point at a time, regardless of how hard it is struck. Interested persons may obtain a descriptive bulletin from the company.

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We have MANUFACTURED and DELIVERED

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And the DEMAND exceeds the SUPPLY

THEY ARE AUTOMATIC

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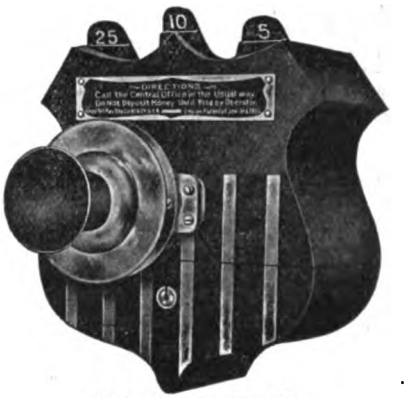

CATALOG SENT

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

AUTOMATIC ENGINEER—Wanted, bright young man, preferably technical graduate, practical telephone experience, if possible automatic. Good salary, bright future. State particulars. Address Box 678, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 678

WANTED—A steady and experienced cable splicer of good habits who wishes to permanently locate with an Independent telephone company of the middle east. Can learn something of interest by writing me. Good pay. Steady work all the year round. All correspondence considered confidential. Address Box 682, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 682

WANTED—A thoroughly competent telephone man with eight years' experience in magneto system desires position as repair man and lineman. Will go anywhere. Best of references given. Steady work wanted. Address Adna Miller, New Boston, Ill. 683

WANTED—Several men with factory experience as installers on central energy switchboards. Address Box 686, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 686

WANTED—Position as manager or superintendent of large Independent system in southwest. Six years' experience with large Bell company. Now manager of large exchange. Good reasons for desiring change. A1 references. Address Box 687, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 687

POSITION WANTED—A salesman who knows apparatus and is a practical telephone man desires position with first class manufacturing company. Open for engagement October 8th. Address Box 690, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 690

WANTED—Position as cable splicer with good telephone company. Am fast, accurate and neat workman, also good locating cable trouble. Want permanent job, fair wages. Address Box 692, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 692

WANTED—Position as manager with a good telephone company. Fill the bill of Ideal Manager as described in issue of June 16th this paper. Address Box 693, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 693

WANTED—Telephone Accountants. Correspondence solicited from men capable of installing our Up-to-date Accounting and Filing Systems. Give age, experience, references, daily charges. Address The Edwards-Hine Co., Grand Rapids, Mich. 696

WANTED—Whirlwind salesmen. Men who are resourceful, energetic and capable of commanding large salaries; the kind of men who are not accustomed to take "No" or "We will give you an order the next time you are here" for an answer. For such men we have good positions. We are willing that our salesmen should participate in the profit outside of the question of salary. Apply by letter or in person. Address S. A. Duvall, superintendent Long Distance Telephone Mfg. Co., South Bend, Indiana. 694

WANTED—Man to represent us in the State of Maine and surrounding states. One who is thoroughly acquainted with the Independent telephone movement in the state of Maine. Would prefer a man who has some knowledge of the telephone business and has influential friends throughout the State. Apply by letter or in person. Address S. A. Duvall, superintendent, Long Distance Telephone Mfg. Co., South Bend, Indiana. 695

SEVEN YEARS' practical experience with the largest operating companies is what I have to offer in exchange for position of manager. I don't climb pole, but I can estimate cost of construction, and run your plant economically and give service. Address Box 691, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 691

WANTED—City Foreman competent to superintend outside construction and locate and repair cable faults. Plant 2,500 subscribers. State experience, reference and salary. Address Box 668, care THE AMERICAN TLLEPHONE JOURNAL, 100 William street, New York City. 668

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N. B. Services reasonable. Correspondence solicited. Give size and scope of your company and present office conditions.

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BAIRD MANUFACTURING CO.

1506 BRIAR PLACE, CHICAGO

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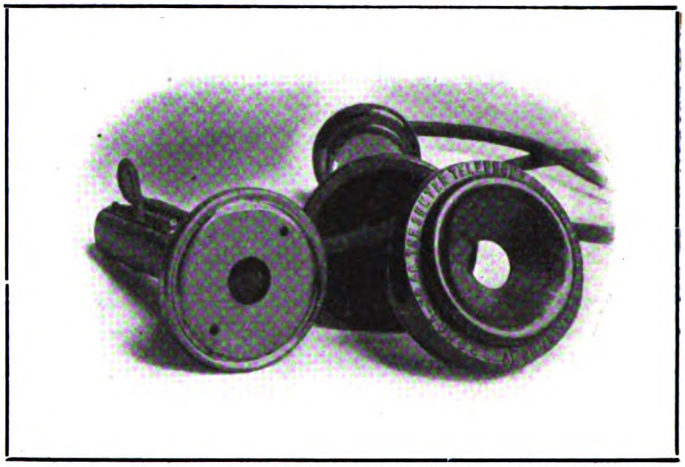
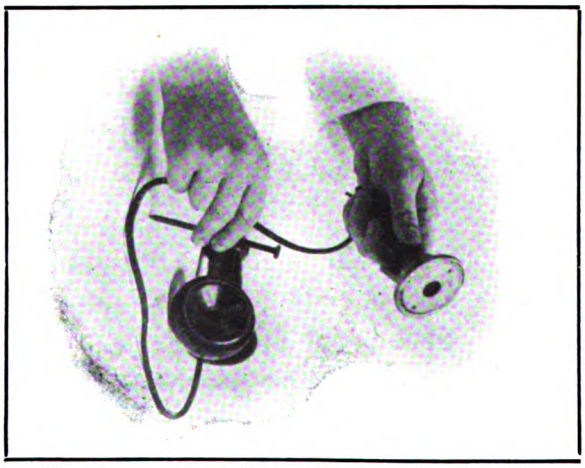
THE NEW SUMTER RECEIVER.

ILLUSTRATIONS from photographs which appear upon this page show the new receiver which has been brought out by the Sumter Telephone Manufacturing Company, of Sumter, S. C., in such a way as to bring out the new features in its design, and to a certain extent emphasize the practical value of others. This instrument has all of its working parts so assembled that they are not in any way dependent for support upon the case. The cup which encloses the coils and supports the diaphragm is in turn held up by and attached to the magnets. The diaphragm is placed upon the rim of this cup, and held in place by a metal cap, which is screwed down upon it in the manner made clear in the illustration.

It is evident from the form of the cup and its use that there can be no variation in the action of the diaphragm, due to its being supported by a material liable to change in volume with variations in temperature, etc., as the company claims is the case with a diaphragm retained in place by a rubber shell. The spools about the pole pieces of the receiver magnet are immediately removable after the working parts have been taken from their shell, and the diaphragm has been released by unscrewing the metal retaining cap, and yet all parts are so designed that, whenever an instrument is taken to pieces, on reassembling its adjustment will be exactly the same as it was before, this being the adjustment which will secure the highest efficiency, as determined by careful tests in the factory.



New Sumter Receiver, with Shell Removed, Showing Working Parts Entirely Self-Contained.



Receiver Removed from Case, with Connections Undisturbed.

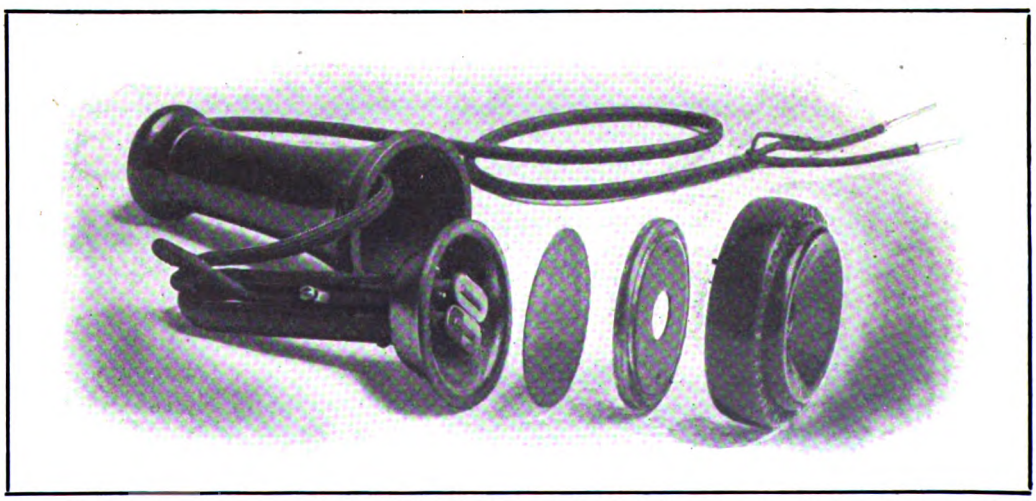
The sockets for receiving the cord terminals are so designed as to take any style of tip. The instrument has a hard rubber case, which the Sumter Company believes, in view of its experience, is the best material for resisting the action of moisture and high temperature. In the Southern states the conditions are such as to make especially desirable this precaution to obtain the material which will best preserve the appearance of this portion of the instrument.

In general the construction of the instrument, the accuracy with which the individual parts are made, the care with which they are assembled and the superior finish correspond to the high standard which has been set by this company for its apparatus.

THE LORD ELECTRIC COMPANY, Boston, Mass., has issued from its railway department a bulletin, designated by the letter C, in which is described the Shaw non-arcing lightning arrester. The design of this apparatus, intended for use in connection with power circuits, presents some very interesting points. The principle of the instrument is explained in the text, while illustrations show the style of mounting and general arrangement. Copies of the bulletin will be sent to those who write to the company.

THE AMERICAN ELECTRIC TELEPHONE COMPANY, Chicago, Illinois, has furnished its Bulletin No. 23, a very interesting description of the Zabel selective ringing system. This system can be furnished in such form as to be installed in connection with instruments of the ordinary type which are already installed, as well as by the use of the specially designed telephones manufactured by the company. Details of the apparatus, wiring, and operating features may be ascertained from an examination of the bulletin.

THE AMERICAN CONDUIT COMPANY, 170 Broadway, New York, has prepared a card which should appeal to many managers, engineers and superintendents of construction who wish to know how to get the best possible construction and save money on underground work.



Parts of New Sumpter Receiver, Removed by Hand, and laid out in Natural order, Showing Metallic Cap for Retaining Diaphragm.

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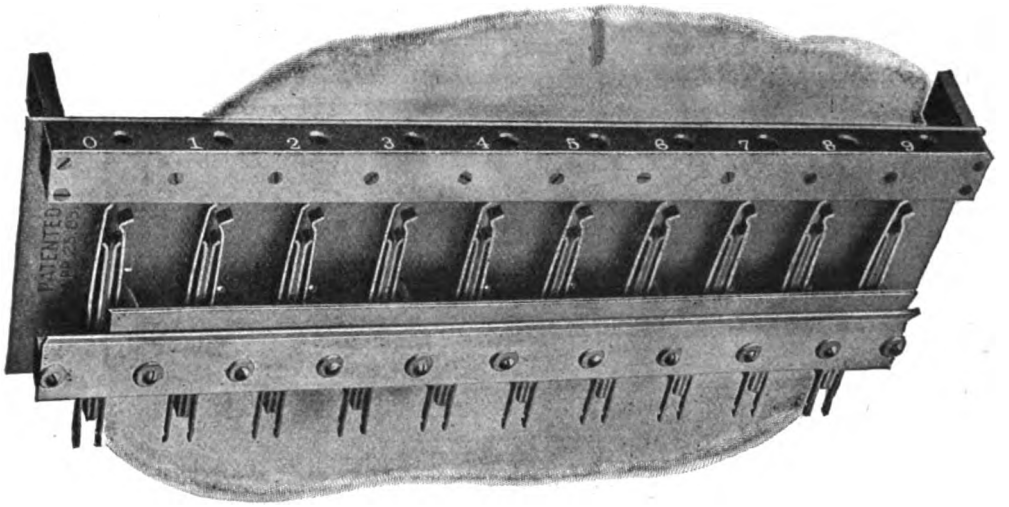
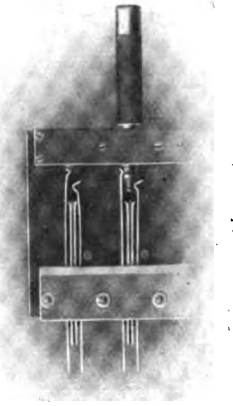


UNITYPE SWITCHBOARD JACKS.



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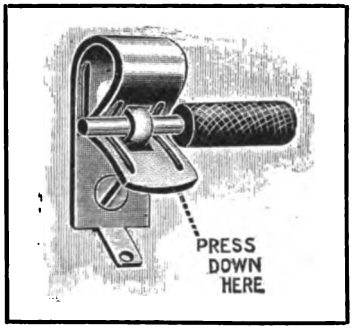

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THE WEEK'S MESSAGES

NEW COMPANIES.

LOS ANGELES, CAL.—Articles of incorporation have been filed by the Northwestern Long Distance Telephone Company, of Los Angeles, Cal., with a capital stock of $1,500,000, and the following officers have been elected: Charles E. Sumner, Portland, Oregon, president; Charles C. Porter, Los Angeles, Cal., secretary; A. King Wilson, Portland, attorney-in-fact.

COLUMBUS, ILL.—Articles of incorporation has been filed by the West Union Telephone Company, with headquarters at Columbus. The capital stock is placed at $900 and the stockholders are as follows: C. Slade, J. P. Deege, Alvin Koch, J. A. Martin, John H. Longlett, W. Lierly, E. B. Richards, Nathan Lytle, C. E. Tilton, L. L. Callahan, W. C. Muder and others.

BUXTON, IA.—A new Independent telephone company has been formed in the vicinity of Buxton. Lines are to be built to Beacon, where connections will be made with the Oskaloosa Home Company.

EUREKA, KAS.—The Star Mutual Telephone Company, of Eureka, has filed articles of incorporation.

GUEYDAN, LA.—At a recent meeting of farmers and business men of Gueydan, an Independent telephone company, to be known as the Farmers' Mutual Telephone Company, Limited, was formed, and the following officers elected: H. L. Gueydan, chairman; W. M. Cowan, secretary. The company will start with a capital stock of $5,000, and lines will be built from Gueydan to Lake Arthur, Shell Beach, Klondike and Relief.

BALTIMORE, MD.—A new Independent telephone company, to be known as the Subscribers' Mutual Telephone Company of Maryland, is to file articles of incorporation at Annapolis. The company will have a capital stock of $500,000, and will enter the field of active business in about thirty days. It will be incorporated under the general incorporation act of Maryland, which will allow it to go before the Legislature to amend its charter whenever desirable. At present the incorporators are preparing a deed of trust in order to secure an issue of $1,000,000 5 per cent bonds. The city council will be asked in a few days for a franchise to make use of the streets and subways for the construction of the system. The incorporators of the new company are J. Lefferts Conrad, of Trenton, N. J., president; Thomas E. Weems, New York city; James W. Owens, of Annapolis; Charles C. Wight, of Baltimore, and Samuel B. Hardy. Mr. Wight will be secretary and treasurer of the company; Messrs. Henry Yewell Bready and James W. Owens, general counsel, and Messrs. F. B. Bready & Company, fiscal agents.

WESTERLO, N, Y,—The Indian Fields Telephone Company has been incorporated, and will construct and operate lines from Westerlo to Indian Fields and Keepers' Corners. Among the directors are P. W. Whitbeck, W. D. Jester, C. R. Whitbeck, A. C. Koonz, G. G. Dickenson, A. D. Caldwell, Daniel Snyder, Wheelock Udell and R. J. Hanck.

GENEVA, O.—The organization of a farmers' telephone company is under consideration by a number of farmers at Geneva. L. W. Lee, who has been largely interested in the formation of rural lines in Hartsgrove, of which place he is a resident, Trumbull and Harpersfield, is the leading spirit in this movement.

WILLZETTA, OKLA.—The Willzetta Farmers' Telephone Company, of Willzetta, Okla., has been incorporated with a capital stock of $1,500. Among the incorporators are J. F. Thompson, W. S. Cooper, D. P. Unruh, Jackson Clark and F. F. Neier.

SALEM, S. D.—The Center Telephone Company has been incorporated with a capital stock of $17,000.

MOSHEIM, TENN.—Articles of incorporation have been filed by the Mosheim & Little Chucky Telephone Company, of Mosheim, Tenn. The incorporators are L. B. Harrison, J. M. Hendry, C. F. Hartman, J. M. Cobble and A. J. Johnson.

SALT LAKE CITY, UTAH.—Articles of incorporation will shortly be filed for a new Independent telephone company to operate in southern Utah, in the plan of which is to be ultimately included every town in the southern part of the State in a circuit that will have long distance connections with the Utah Independent Telephone Company in Salt Lake. A franchise to operate in Juab county has been secured, and a franchise in Nephi has also been asked for. The Nephi company, as well as those of several other cities in Southern Utah, will be in position to erect its plant at once. Franchises are to be applied for in Sanpete and Sevier counties. Mr. C. O. Harris, of Salt Lake City, is one of the organizers, and associated with him are C. A. Rolfe, of Rochester; C. H. Bigelow and Arthur Dunn, of Los Angeles, and several other prominent men of Salt Lake City.

FRANCHISES.

NEWTON, ILL.—A twenty-five year franchise has been granted by the Newton city council to E. J. Clapp, the present owner of the local telephone plant, with the privilege of installing telephones on both the metallic and grounded systems. It is the intention of Mr. Clapp to expend several thousand dollars in the improvement of his plant.

PITTSFIELD, ILL.—The Home Telephone Company, of Quincy, Ill., has made application for a franchise to extend its lines in Pittsfield and other parts of Pike county.

HUNTINGTON, IND.—The New Long Distance Telephone Company, of Indianapolis, Ind., has applied for a franchise at Huntington. It is its intention to construct a copper wire circuit between Huntington and Indianapolis. The line is to be a direct one, affording direct communication without any interruptions from mid-stations. Connections will be made with the Home Telephone Company, of Fort Wayne, which will string a circuit to Huntington as soon as the Long Distance line is ready for the connection.

FINANCIAL.

GREENVILLE, ILL.—The capital stock of the Bond County Telephone Company, Greenville, Ill., has been increased from $6,000 to $18,000.

LOUISVILLE, KY.—At a recent meeting of the directors of the Louisville Home Telephone Company, a quarterly dividend of 1 per cent, payable October 1, was declared. This virtually places the stock on a 4 per cent dividend basis, which, it is announced, will be a permanent institution. The company's three previous dividends have been as follows: The first for a disbursement of 1¼ per cent in July, 1905, the second a distribution of 2½ per cent in January and 1½ per cent in July of this year.

NEW BEDFORD, MASS.—The Automatic Telephone Company of New Bedford has declared a quarterly dividend of 1½ per cent, payable October 1, to stock of record September 11.

FESTUS, MO.—The Festus Telephone Company has increased its capital stock from $2,500 to $7,500.

GRAND FORKS, N. D.—At a recent meeting of the city council of Grand Forks the 2 per cent premium pledged by the Tri-State Telephone Company as a franchise offset was paid. The earnings of the company, as reported from May 31, 1905, to June 1, 1906, aggregated $12,250. Two per cent of this, $245, was paid to the city in accordance with the proposition under which the franchise was granted.

COMBINATIONS.

GALESBURG, ILL.—The Galesburg Union Telephone Company, which recently secured a franchise from East Galesburg to do business in that place, has taken over the lines formerly operated from Dahinda, and is to connect them directly with the exchange at Galesburg.

VINTON, IA.—The controlling interests in the Benton County and Vinton Telephone Company have been acquired by S. S. Lichty and others. Mr. Lichty has been made president and manager of the company, and under his direction the outside plant of the company will be rebuilt.

ELECTIONS.

QUINCY, ILL.—The following directors have been elected by the Quincy Home Telephone Company, Quincy, Ill.: David Stern, J. H. Bastert, W. T. Duker, David Reidinger, J. R. Pearce, E. Best, Fred Wilms and Frank J. Penick. The following officers were also elected: President, J. R. Pearce; secretary, Frank J. Penick.

VAN WERT, IA.—The Van Wert Rural Telephone Company, Van Wert, Ia., has elected the following officers and directors: I. N. Skidmore, presi-

NEWS—WANTED

THE matter contained upon the message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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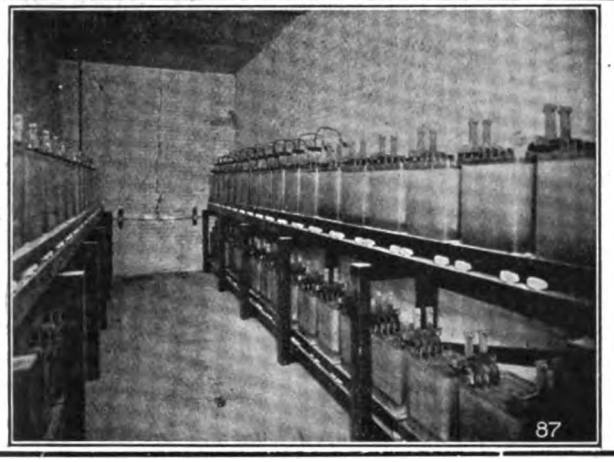

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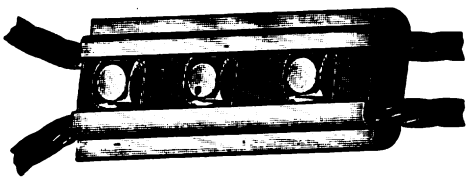

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dent; M. P. Garber, vice president; E. O. Stearns, treasurer; W. H. Ransom, secretary. Directors: Wilbur Howell, Charles Keller, Grant Spencer, J. Downey, George Barr.

ANADARKO, OKLA.—The following officers have been elected by the Anadarko and Apache Telephone Company: President, Mr. Cox, Anadarko, Okla., R. F. D. No. 4; vice president, W. W. McElheing; secretary, R. M Pell; treasurer, W. F. Leazenby, all of Anadarko. Trustees: J. S. Harper, John Allison, W. Groseclose.

PERSONAL.

C. F. GROVER, who has been superintendent of the Manchester district, has been transferred to Lowell, Mass., to take charge of the newly established district of the New England Telephone & Telegraph Company.

R. R. HILLARD has taken the position of manager of the Central Union Telephone Company's plant at Bowling Green, O., also acting as county superintendent of the company's interests.

CHAS. D. KEATOR has been appointed manager of the Cumberland Telephone Company's exchange at Jeanerette, La.

C. R. KEHOE has been appointed manager of the Citizens' Telephone Company at Jackson, Mich., and will have charge of the exchange at that place.

D. B. SMALL has been appointed superintendent of the Manchester (N. H.) district of the New England Telephone & Telegraph Company.

J. P. STARNES has been named manager of the Cumberland Telephone Company's exchange at Kentwood, La.

GEORGE W. WOOD has been appointed construction engineer of the Central New York and the Empire State Telephone and Telegraph Companies.

MISCELLANEOUS.

WHEATLAND, CAL.—The Independent telephone line from Wheatland to a point near Marysville has been acquired by F. W. Anderson, of Wheatland. Mr. Anderson formerly owned half of the line, and now that he has acquired the other half from J. B. Dalby and soon expects to again apply to the supervisors of Marysville for a franchise.

HARTNEY, MANITOBA, CANADA.—The Rural Telephone Company, of Hartney, expects soon to establish connections with Lauder, Underhill and Deleau.

MELITA, ONT., CAN.—The Melita-Arthur Telephone Company has been granted permission to erect a section of its system in Berenda. Both Waskada and Napinka will likely have telephone connections this fall.

New Construction in the Field

JONESBORO, ARK.—Work on the telephone system for the Home Telephone Company, of Jonesboro, Ark., will begin at once, and it is the company's intention to make the plant up-to-date in every particular.

PERRYVILLE, ARK.—A new telephone line from Perryville by way of Aplin to Nimrod is being constructed. The line between Perryville and Perry is being reconstructed, and efforts are being made to induce the company to extend the line to Hollis and Mountain Valley.

FULLERTON, CAL.—The Home Telephone Company is constructing a new telephone system at Fullerton. It is estimated that over six carloads of poles will be required before the work is completed, and a strictly up-to-date service is promised.

WILMINGTON, DEL.—It is the intention of the West Chester, Wilmington and Kennett trolley line to install a telephone system with eighty-eight stations.

JASPER, FLA.—The Jasper Telephone Company, of Jasper, Fla., has been making many improvements and extensions in its system at White Springs.

HIGHLAND, ILL.—An exchange is to be installed by the Farmers' & Merchants' Telephone Company at Highland, Ill.

CAMBRIDGE CITY, IND.—An additional line between Richmond and Cambridge City is soon to be built by the Citizens' Telephone Company of Cambridge. This work has been made necessary owing to the greatly increased business of the company.

IOWA CITY, IA.—The Johnson County Telephone Company is planning many improvements for the betterment of its system at Iowa City.

VAN WERT, IA.—The Van Wert Rural Telephone Company, of Van Wert, Ia., which reports a very prosperous year, has under consideration the erection of a line to Osceola, and the installation of a new 100 drop switchboard, of which it is in need to take care of its increasing business.

SONORA, KY.—The Sonora and Elizabethtown Telephone Company has recently completed a metallic circuit between the two towns. The office in Elizabethtown will be located in the office of the Hardin County Telephone Company.

CHARLEMONT, MASS.—A new line has been constructed by the Deerfield Valley Telephone Company to Charlemont, and work on a line from Readsboro to Whitingham will shortly be commenced.

CLARKSTON, MICH.—The lines of the Rural Telephone Company of Clarkston are being materially improved and extended. Manager H. L. Garter reports that the success of the line has been even greater than he anticipated when he started the campaign for a rural line.

JOPLIN, MO.—The Home Telephone Company is stringing four hundred pairs in overhead telephone cables which will afford much better service. These cables are to take the place of the overhead wires, and the company intends to extend its cable plant to the northern part of the city, eventually abolishing overhead wires. About $100,000 has already been spent on this work, which has been required to take care of new business.

TABLE ROCK, NEB.—The Western Telephone Company is constructing a new line from Omaha to Kansas City, through Table Rock. The company expects to do a long distance business, and will have but three offices between the two cities, namely Table Rock, Lincoln and St. Joseph.

BUTTE, MONTANA.—The Montana Independent Telephone Company, which was recently granted a franchise in Butte, is soon to commence the erection of its exchange. The capacity of the company's conduits will be for 15,000 subscribers and 15,000,000 feet of insulated wires. About 3,000 miles will be installed. Two hundred carloads of material will be required for the construction work of the new line, and the company will have more than thirty miles of pole lines in the residential portion of Butte, Meaderville, Walkerville and Centerville.

GRANT, N. M.—A telephone line has been established between Grant, a station on the Santa Fe Pacific Railroad, in Valencia county, and the town of San Rafael, a distance of three miles.

ALBION, N. Y.—Additional lines are to be built by the Home Telephone Company in Albion, N. Y.

CANAJOHARIE, N. Y.—An extension of the Inter-State Telephone Company's lines from Canajoharie to Fonda, and a line from Fonda to Amsterdam are among the improvements planned by that company.

CORTLAND, N. Y.—The Inter-Ocean Telegraph and Telephone Company has about completed the preliminary arrangements for the installation of its system in Cortland, at which place it will operate in competition with the Bell Company. Work will commence on the erection of the company's office building at once, as well as the construction of its system, right of way privileges having been secured in the city.

FARGO, N. D.—Good progress is being made by the North Dakota Independent Telephone Company in the building of its trunk line between Fargo and Bismarck. The formal amalgamation of the various Independent companies which will make up the new concern will take place October 1, when the North Dakota Independent Telephone Company will take over all the wires and other properties belonging to the smaller companies. While the general offices of the company will be established in Fargo, it is probable that the president, J. R. Lyons, and the auditor will have offices in Minneapolis.

NEW LEXINGTON, O.—The new $10,000 switchboard of the Citizens' Independent Telephone Company is being installed. The new company is backed by a number of wealthy capitalists, who are sparing no expense to equip an up-to-date plant; and it is its intention to operate in every town in Perry county, with good local and long distance service to all parts of the country.

CLEVELAND, O.—The United States Telephone Company contemplates the expenditure of $200,000 in the improvement of its toll line service throughout northern Ohio. The company will make Crestline its headquarters, where $100,000 will be spent to cover the installation of an exchange. The line will extend through New Haven, Greenfield and Peru townships to Norwalk, thence to Toledo and other points. It will be constructed of fifty-foot poles, and ten-pin cross arms. The business of the Independent telephone company has increased to such an extent as to make these improvements necessary.

NUMIDIA, PA.—A new telephone exchange is being installed at Numidia, this being the headquarters of the new Roaring Creek Valley Telephone Company.

BRYAN, TEXAS.—The Bryan Telephone Company is reconstructing its system at Bryan, changing it from a wire to a cable system.

WILLIAMSTOWN, VT.—The People's Telephone Company is making many improvements in its system at Williamstown.

STEVENS POINT, WIS.—The toll line of the Stevens Point-Appleton Company is being entirely rebuilt, and the line between Stevens Point and Chippewa Falls is also being reconstructed.

UNDERGROUND.

SAN JOSE, CAL.—The Sunset Telephone Company is placing some of its wires underground in San Jose.

RICHMOND, IND.—Considerable conduit work is being done by the Home Telephone Company in Richmond, Ind.

CEDAR RAPIDS, IA.—The Cedar Rapids and Marion Telephone Company is to do some conduit work in Cedar Rapids.

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VOLUME XIV. SATURDAY, OCTOBER 13, 1906. NUMBER 15

Extended Telephone Service at This Year's Vanderbilt Cup Race

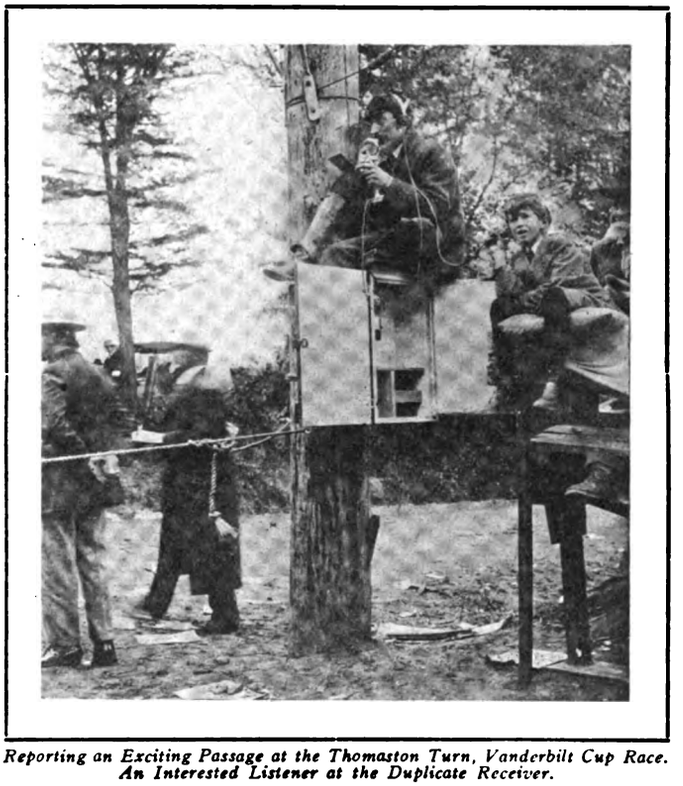
By John Grant.

EXTENSIVE as was the special system of telephones installed in 1905 for the use of the officials conducting the Vanderbilt Cup Race and the convenience of the spectators who saw this great event from the grand stand, it was surpassed this year both in number of telephones and in the use made of the service by the public. Although there were various changes in details of the system the same necessities as those present in 1905 were felt this year, and the same plan was adopted in working out the system by Mr. A. R. Pardington and his associates.

One distinct group of instruments was devoted to the use of the ten officials of the New York Timer's Club, who had charge of the timing of contestants. On the second floor of the official stand were centered lines radiating to various parts of the course, each terminating at this central point in an ordinary desk stand instrument. In the middle of this row was the group of five instruments used by the timers. These were connected to stations at the 5, 10, 15, 20 and 25 mile points, respectively, and were used for the reception of reports of the numbers of cars and the time of passing each of the reporting stations. This information was recorded for the future use of officials, and was also transmitted immediately to the scorers at the bulletin boards, where it was posted for the information of the spectators.

One of the new features introduced this year was a large outline map of the course, upon which were posted figures representing the leading cars. As the positions of these cards were changed immediately after each car passed a timing point the intervals which elapsed were very brief, averaging very close to five minutes each, and the relative positions of the leaders were shown with very fair accuracy, and in such a way as to be evident at a glance.

In addition to the five timing stations there were twelve other instruments located beside the course, one of these being located at each of the turns. These instruments were used during the race for checking up the positions of the cars, and also made it possible to give practically instantaneous warning of an accident occurring at any part of the course. The danger of a disabled car being run down was thus greatly lessened.



Reporting an Exciting Passage at the Thomaston Turn, Vanderbilt Cup Race. An Interested Listener at the Duplicate Receiver.

The nature of the equipment provided at the stations placed at intervals along the course is evident from a glance at the photographs. It consisted of an ordinary portable desk stand, equipped with multiple head and hand receivers, magneto ringer, and three cells of dry battery for transmitter supply.

It will be noted that the use of dry batteries at all stations is a new feature, these having been placed only at the stations provided for the control of railway trains, where the telephones were not constantly in use, during the 1905 race. The telephones at the various stations were in use practically all the time from 6 until 11 o'clock on the morning when the race was held, and at the end of this time the transmission was good.

The arrangements for giving service to the public, from pay stations, were this year conducted on a more extensive scale than before. In all there were provided fifteen instruments. Ten of these were located in the special pay station room at the official stand; one was outside the enclosure at the rear of the official stand, where it was easily accessible to the public; while four stations were in the grand stand on the opposite side of the road from the official stand.

Owing to the division of the stations between three separate locations it was considered to be advisable this year to install a two position switchboard, with trunks to central offices, and the pay station instruments on local extensions, instead of carrying lines directly from the instruments to exchanges, as was done last year. A two position magneto switchboard was therefore placed in the room provided for pay stations. It was equipped with eight trunks to the Long Island toll board of the New York and New Jersey Telephone Company, and with five trunks, the terminal of each of which was located in some one of the three central offices nearest the official stand.

The pay station instruments connected to the local lines were the ordinary portable desk stands, provided with a transmitter cut-out button and multiple head and hand receivers. The stands were ranged along a shelf, in front of which were placed seats for those who used the telephones. A directory was provided for each instrument.

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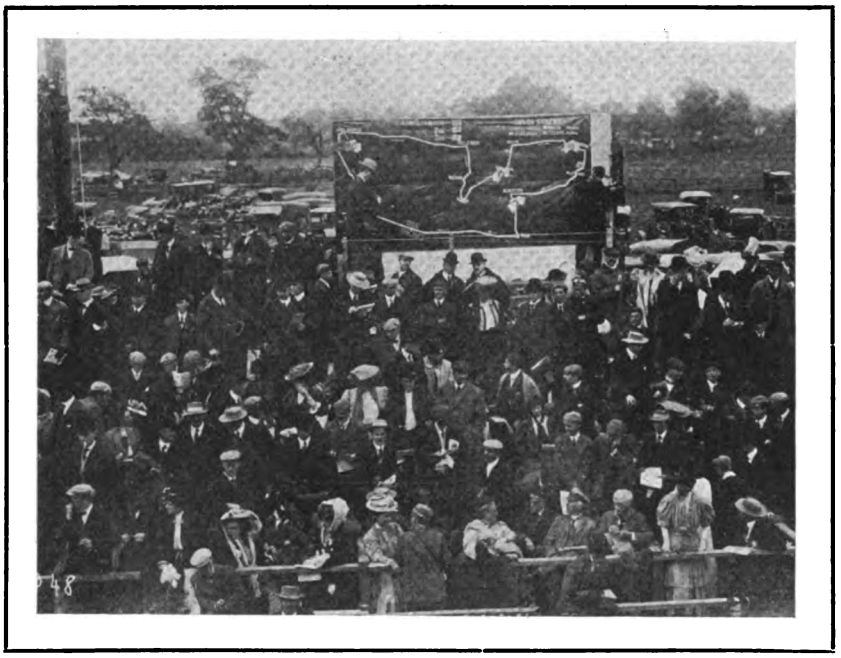
Front View of Course Telephone.

The pay stations were attended by two men in the official stand, one at the four instruments in the grand stand, one supervising attendant, and three messengers. An inspector of the Pay Station Department of the Telephone Company was present during a large part of the time the instruments were in use. The attendants stayed over night near the course, and reported for duty about four o'clock in the morning. Not much business was handled until about 6:30, just after the race had been started. From this time on, however, the telephones were used very steadily. The group of four instruments in the grand stand was in continuous use for at least 2½ hours, and the reporters kept the lines from the official stand busy. Some of the newspaper men worked in teams, the man outside supplying "copy" as fast as it was written to his companion at the telephone, who transmitted it to headquarters. One of the men who handled his work in this manner sat at the telephone for over four hours, and paid for his conversation a toll of over $13, figured on the basis of 25 cents for a five-minute talk. Interested persons observed that by the general public there was comparatively little use of the telephone for business purposes, all of the spectators being too completely absorbed in watching the progress of the race. This is also indicated by the fact that there was but one toll call during the race. The one thing which did overcome the devotion to sport was the keen interest taken by these people, who had either been out all night, or started for the course long before daylight, in the provision of a hearty and appetizing luncheon at their homes, and this was responsible for many messages.

In spite of the fact that the pay station instruments were very heavily used, the accurate judgment of those who estimated on the facilities is indicated by the fact that throughout all the time that this special equipment was in use, supplying the telephone needs of a very large number of people, there were but few calls delayed. It was estimated that at one time there were four or five people waiting to get a chance to use the single instrument in the rear of the official stand, and that two or three people were waiting at another time to have an opportunity to use one of the instruments in the group of ten in the regular pay station room in the official stand. In addition to the facilities provided in the way of instruments and attendants at the stands at the course, the company also made provision for caring for the rush of business which was expected to occur, and actually took place at points outside. Attendants and messengers were provided without charge at several of the nearby hotels to facilitate the transaction of pay-station business during the rush hours. The company also installed three temporary extra trunks between the Garden City Hotel switchboard and the Long Island toll board, and two special trunks between the Garden City central office and the Long Island toll board.

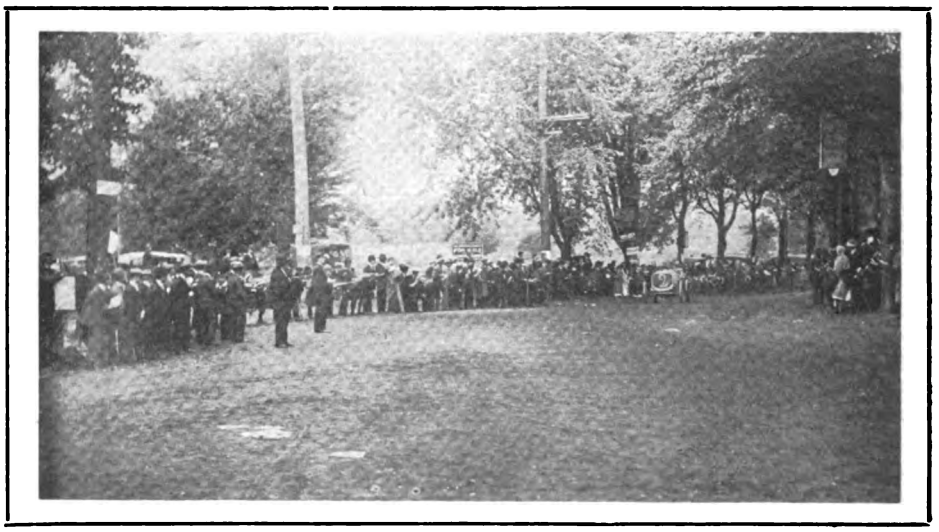
In addition to the arrangements for handling the race and for providing telephone facilities for the public, private lines from the official stand to the editorial offices of several newspapers in New York and Brooklyn were provided. Morse circuits were provided to the rooms of the Associated Press and other subscribers to special service of this class. Breast transmitters were provided for all the instruments on the newspaper lines.

Some of the contestants whose headquarters were at some distance from the grand stand maintained bulletin boards, or kept score cards, in order that the position of their representatives in relation to the other contestants might be known at all times. There was also a telephone line between the official stand and the band stand for the direction of the music.



Map on which Positions of Cars were Shown; Movements were Traced by Telephoned Reports

As indicated upon the map, there were in general three methods followed for completing connections from the stand to various instruments about the course. In places where the new lines could be concentrated in sufficient numbers a lead cable was placed temporarily to carry them. For this purpose four miles of 25-pair lead cable were



Tracy, the American Driver, Rounding the Lakeville Turn. Telephone at Extreme Left.

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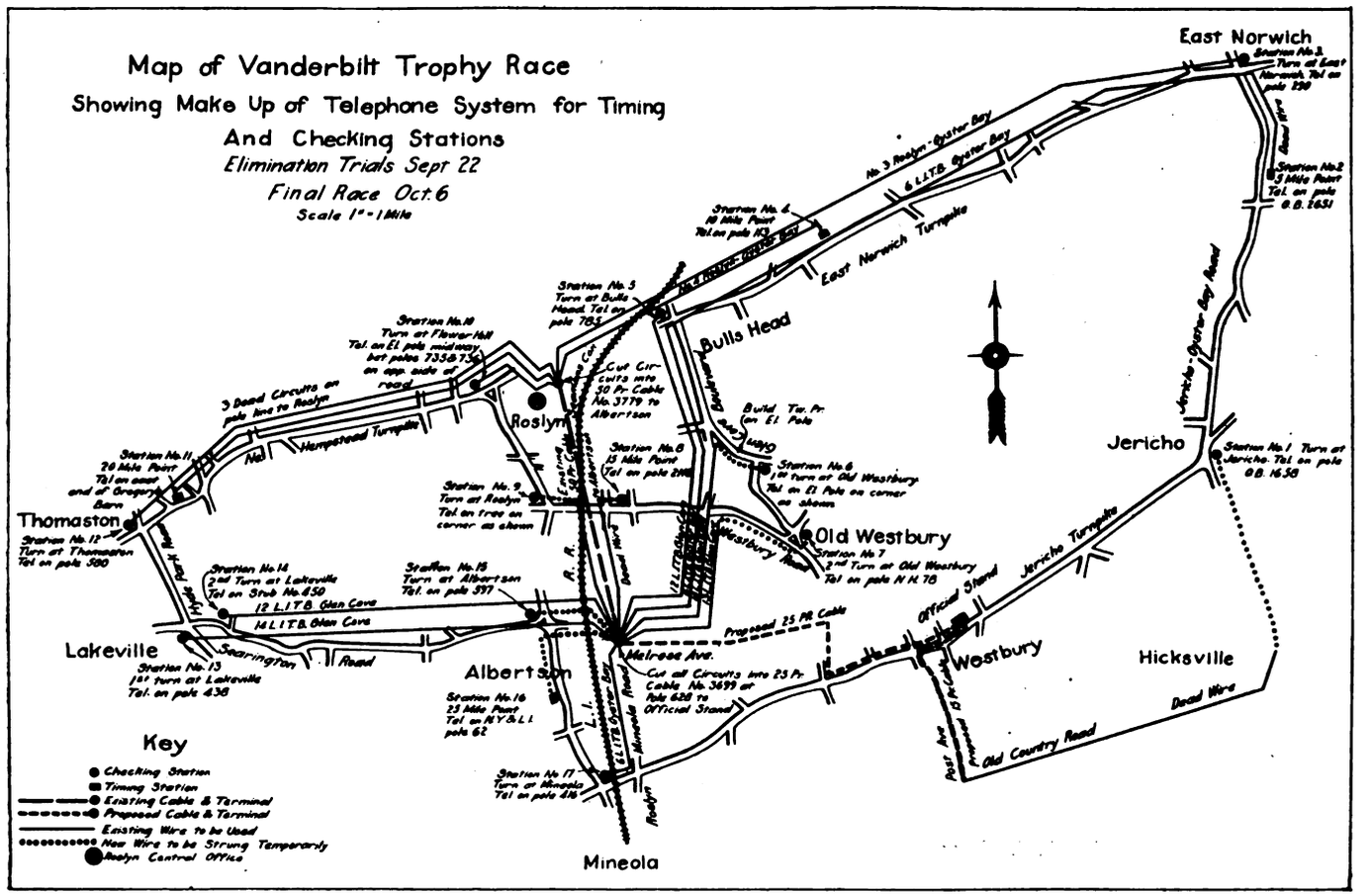
used, run from the official stand to a point at Albertson, where there were available telephone suburban toll trunks from the main lead to carry the lines to other portions of the course. This cable was hung temporarily, being supported on the poles at a height of only a few feet from the ground. It is interesting to note that in putting up this cable no splices were wiped; the sleeves were simply dressed tightly against the lead, and, as an additional precaution against the entrance of moisture, the joints were covered with ordinary Okonite tape. Although there was a great deal of moist weather during the time this cable was in place, there was not the slightest trouble on the day of the race, showing that the moisture had no effect and that this class of work is satisfactory for temporary installation. Where it was

(*Continued on page 241.*)



Map of Course Covered by Contestants for the Vanderbilt Cup. Locations of Telephones and Nature of Construction Required for the Special Telephone System are Indicated by Conventions.

Consolidation and Co-operation of Pennsylvania Companies for Toll Service

THE American Union Telephone Company, which was chartered by the Commonwealth of Pennsylvania May 31 last, was brought into working existence at a meeting held in Philadelphia during the first week of October. The company has a capital stock of $25,000,000. There are 100,000 shares of preferred stock and 150,000 of common; $2,000,000 worth of each has been issued.

The new move is generally regarded in Pennsylvania as one of the most important steps which has been taken in that state since the formation of the Independent companies. It is generally believed that the consolidation will have a salutary effect in reducing toll charges and expediting service between cities in the state and outside the state.

The companies which are in the new merger are as follows:

United Telephone and Telegraph Company, operating from the Philadelphia county line northwest to the city of Williamsport, and west to the city of Altoona, inclusive, embracing the counties of Chester, Montgomery, Delaware, Lancaster, Lebanon, Schuylkill, Northumberland, Union, Snyder, Montour, Columbia, Lycoming, Clinton, Centre and Blair.

Cumberland Valley Telephone Company, extending from the city of Harrisburg southwest through the Cumberland Valley to the State line, and northwest to the borough of Lewiston, embracing the counties of Dauphin, Perry, Mifflin, Juniata, Cumberland, Franklin, Adams and York.

Lykens Telephone and Telegraph Company, operating exchange centres at Elizabethville, Lykens, Millersburg and Tower City.

Cumberland Valley Telephone Company, of Baltimore city, operating in the States of Maryland, Virginia and West Virginia, embracing the counties of Washington, Frederick and Carroll, in the State of Maryland; Frederick and Clarke, in the State of Virginia; Berkeley and Jefferson, in the State of West Virginia.

Boyds and Damascus Telephone Company, embracing the county of Montgomery, Maryland.

Huntingdon and Clearfield Telephone Company, embracing the counties of Centre, Clearfield, Cambria and Jefferson.

Cambria Telephone Company, embracing the county of Cambria.

Indiana Telephone Company, embracing the county of Indiana.

Bradford County Telephone Company, embracing the county of Bradford, Pa.

Port Allegeny Telephone Company, embracing the counties of McKean and Potter.

Petroleum Telephone Company, embracing the counties of Crawford and Venango.

Commercial Union Telephone Company, embracing the counties of Elk and Jefferson.

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Union Telephone Company, of Erie, embracing the counties of Erie, Crawford, Mercer, Newcastle, Venango, Beaver, Warren, McKean and Potter, in the State of Pennsylvania, extending to the city of Olean, inclusive, in the State of New York, and to the city of Youngstown, in the State of Ohio.

York State Telephone Company, embracing principal exchange centres at Elmira, Binghamton and Owego, in the State of New York.

Philadelphia, Pittsburg and Erie Telephone Company, embracing present and proposed long distance lines in forty-three counties in the State of Pennsylvania, as follows: Blair, Cambria, Beaver, Allegheny, Armstrong, Chester, Clearfield, Clinton, Bradford, Erie, Huntingdon, Elk, Indiana, Mifflin, Crawford, Mercer, Lawrence, Warren, Tioga, Westmoreland, Lycoming, Dauphin, Lehigh, Wyoming, York, Lebanon, Snyder, Union, Columbia, Juniata, Perry, Berks, Lancaster, Adams, Northumberland, Chester, Delaware, Susquehanna, Luzerne, Schuylkill, Lackawanna, Montgomery and Cumberland.

The new company has traffic agreements and connections providing for the interchange of long distance messages with the following companies:

Keystone Telephone Company, of Philadelphia; Del-Marvia Telephone Company, of Wilmington; Maryland Telephone and Telegraph Company, of Baltimore; Consolidated Telephone Companies of Pennsylvania, operating principally in the cities of Reading, Easton, Allentown, Bethlehem, Hazleton, Scranton and Wilkes-Barre; Pittsburg and Allegheny Telephone Company, operating in the city of Pittsburg, affording connection with lines of the United States Telephone Company, fully covering the States of Ohio and Indiana; United States Telephone Company and Cuyahoga Telephone Company, operating in all the principal cities and towns in Ohio and Indiana, including Cleveland, Dayton, Indianapolis, etc.; Inter-Ocean Telephone Company, affording connections by one route with important cities in the State of New York, including Buffalo, Rochester, Syracuse, and the Cumberland Telephone Company, operating in the city of Cumberland, Md., affording connection with important Southern towns and cities.

The directors of the company are:

P. M. Chandler, Philadelphia, Chandler Brothers & Co., brokers and bankers.

John W. Garland, Pittsburg, president Safety Armorite Conduit Company, president Industrial National Bank.

W. B. Trask, Erie, vice-president Marine National Bank, president Trask, Prescott & Co.

A. W. Lee, Clearfield, vice-president Clearfield Trust Company.

James Kerr, Clearfield, president Pennsylvania, Beech Creek and Eastern Coal and Coke Company.

J. L. Spangler, Bellefonte, president Bellefonte Trust Company, president Brubaker Coal Company.

William Kaul, St. Mary's, banker.

Edward Bailey, Harrisburg, president Harrisburg Trust Company, president Harrisburg National Bank.

Lyman D. Gilbert, Esq., of Harrisburg.

George W. Reilly, of Harrisburg, vice-president Pennsylvania Surety Company, treasurer Harrisburg Trust Company.

B. F. Meyers, of Harrisburg.

Rembrant Peale, New York city, president Peale, Peacock & Kerr, coal operators.

J. Sloat Fassett, Elmira, N. Y., vice-president Second National Bank.

Ellis L. Orvis, Bellefonte, presiding judge Forty-ninth Judicial District; president Hay's Run Fire Brick Company.

S. P. Light, Lebanon, vice-president Lebanon County Trust Company.

H. Prentiss Taylor, Pittsburg, banking house of H. P. Taylor & Co.

Operating Methods*

By A. J. Ulrich, Traffic Manager, Keystone Telephone Co. of Philadelphia.

SOME traffic men are of the opinion that the more a student is taught about the mechanical features of the board the better operator she will make, and have charts and diagrams in the schoolroom showing circuits, relays, etc. Whereas it is possible that there may be something in this claim, it is believed that those in charge of the operating branch of the work will agree with the writer that the best operators they know of have very little knowledge of circuits and the mechanical parts of a switchboard.

The traffic department of the Keystone company thinks it best to have all applicants fill out an application blank in person giving name, address, age, former employment and the names of at least two references; if former employment was with some telephone company; length of time employed; whether she worked on local or long distance boards, and the reason for her leaving. The applicant is advised that for the first week or ten days she will not get any pay, but if satisfactory progress is made by her at the end of that time, she will be placed on the students' pay roll until such time as she is assigned to an exchange, whereupon she is transferred to the regular operators' pay roll of that exchange. Applicants are examined as to height, reach and eyesight, a regular optician's eyesight test chart being used for the eyesight test. Applicants must be 5 feet 4 inches in height, must have a reach of 29 inches, and be able to pass the eyesight test. If she does not meet these requirements at the time application is filed she is so advised, but if she does, she is advised that she will be notified when to report. In the meantime, the parties she has given as references are written to, and, if satisfactory replies are received, the application is filed until such time as a new class is formed, when applicants who have passed examinations, and whose references are satisfactory, are notified to report to the school for instructions. If an unsatisfactory reply is received from those to whom she has referred, the applicant is rejected, application blank marked accordingly, and filed for future reference in case the applicant should apply for position later on.

The school is in charge of an instructress who does nothing else but teach students. It is in a separate room, equipped with two sections of multiple board so arranged that students can answer and complete connections. The course of instruction is about as follows: Students are first taught the location of the various groups of hundreds in the section, and then the individual numbers in these various groups. Explanation of what is meant by sections, panels, positions, answering jacks, trunk jacks, multiple jacks, and why they are termed such, answering keys, ringing keys, answering and connection cords, and the proper use of each of these pieces of equipment, and the object of pilot lamps. It is then explained and shown how the subscriber calls the exchange, and what phrases are used in handling calls; how and why a "busy" test is made; how long to ring if line tests clear; how to handle call if number in some other exchange is wanted; proper use of call wires; that numbers called for must be repeated back to the subscribers by spelling figures, and with a rising inflection as though asking a question, and not to repeat and instantly cut out, but to wait a moment so as to give subscriber a chance to correct her if she repeated back the wrong number; the meaning of markings on the board, and different colored lamps are then explained; what is meant by flat, measured and pay station service; are tested for speed in picking out correct numbers in the multiple; are advised as to the rules gov-

*Abstract from paper read at the Convention of the Pennsylvania State Independent Telephone Association.

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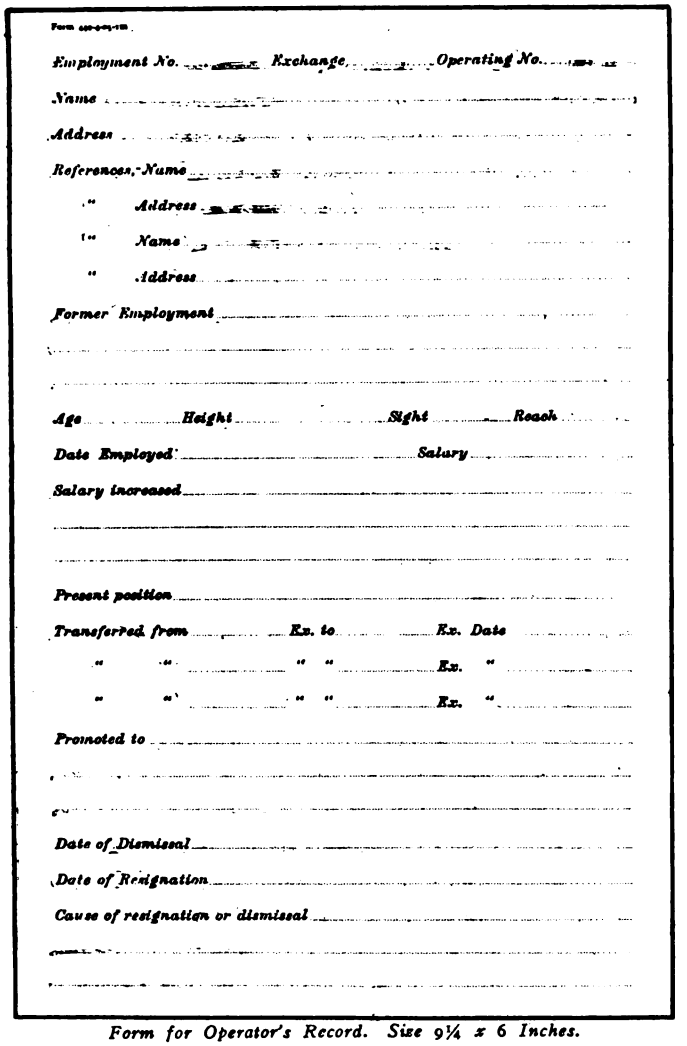
erning operators while in the operating and retiring rooms. Students are then examined in all of the foregoing instructions and, if satisfactory, are then assigned to the various exchanges, and placed on some of the lighter positions. If a student hasn't progressed enough at the end of a week's instruction to indicate that she has the qualifications essential toward the making of an operator she is dismissed from the school.

When a student is placed at an exchange, a card and folder are made out. The card shows on one side her employment number, exchange to which she has been assigned, and an operating number which she is advised of and instructed to give instead of her name when asked for over the wire either by subscribers or service inspectors, name, address, by whom recommended, former employment, age, height, sight, reach, date employed, and at what rate; has spaces left blank on which are marked dates when salary was increased, what her present position is, when transferred from one exchange to another, on what date she was promoted (if such should be the case), date of dismissal, date of resignation, and cause of such dismissal or resignation. On the back of the card are marked date and number of times operator was absent or tardy while in our employ.


Employment No. ..... Exchange, ... Operating No. .....

Name .....

Address .....

References, Name .....

" Address .....

" Name .....

" Address .....

Former Employment .....

Age ..... Height ..... Sight ..... Reach .....

Date Employed ..... Salary .....

Salary increased .....

Present position .....

Transferred from ..... Ex. to ..... Ex. Date .....

" " ..... " " ..... Ex. " .....

" " ..... " " ..... Ex. " .....

Promoted to .....

Date of Dismissal .....

Date of Resignation .....

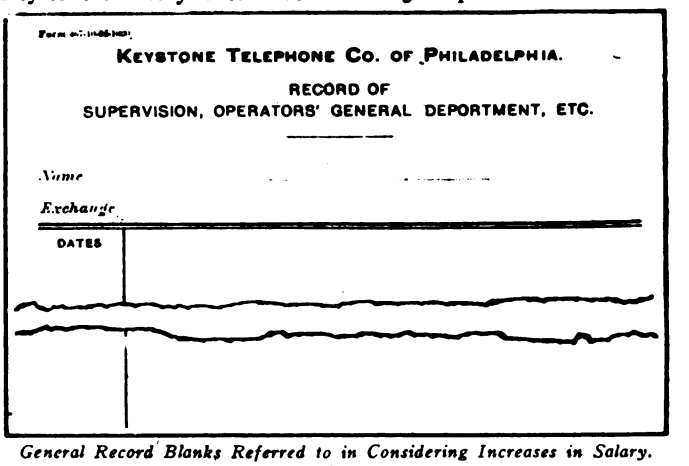
Cause of resignation or dismissal .....

Form for Operator's Record. Size 9¼ x 6 Inches.

The folder and card are sent to the District Manager, who keeps this record while the operator is employed in any of his exchanges, and upon the operator's being dismissed or resigning, he notes the date of dismissal or resignation, its cause, and sends the folder back to the Traffic Manager's office to be filed.

In addition to this card, a deportment blank is also enclosed in the folder. On this is kept a record of the number of times the operator had to be reprimanded in regard to her work, attendance or deportment. These records are referred to by the District Manager when the question of increasing operators' salaries comes up, and it is believed that by this method of keeping operators' records the company is in the best position to know what operators are deserving of increases, and those that are not.

One of the duties devolving on each district manager in the Keystone territory is to have at least 50 supervision tests made


KEYSTONE TELEPHONE CO. OF PHILADELPHIA.

RECORD OF

SUPERVISION, OPERATORS' GENERAL DEPORTMENT, ETC.

Name .....

Exchange .....

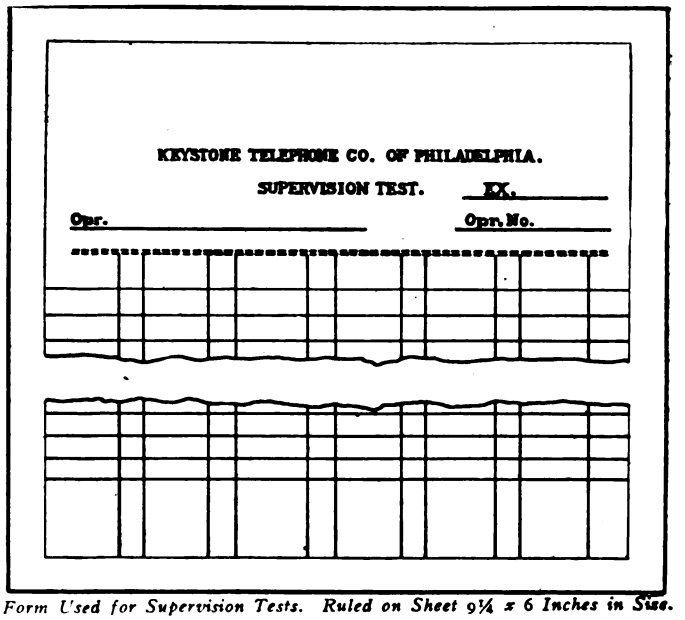
DATES

General Record Blanks Referred to in Considering Increases in Salary.

monthly on every operator in his exchanges. These supervision tests are made by whomever the district manager appoints for this work; one time it may be a chief operator, another time a supervisor, and so on. Whoever does the supervising notes down on a form, which is gotten up for this purpose, the number called, and any irregularities, such as: "Operator asked for number more than once" (whether it was the fault of operator or subscriber), "did not use rising inflection," "did not repeat number," "connected with wrong number," "failed to make proper 'busy' tests," "connected over the 'busy,' "premature disconnects," "poor supervision," etc. The results of these supervision tests are then turned over to the district manager, after which they are filed in the operator's individual folders. District managers must maintain good discipline at all times, and keep the traffic manager fully advised as to the need of more trunking facilities, not only with the various exchanges, but also with the private branch exchanges in his district, so that the private branch subscriber can be seen and advised as to the amount of traffic handled on his private branch trunks, with the object in view of possibly getting the subscriber to have additional trunks placed, which would be the means of giving not only the subscriber, but those who do business with him, a better service.

The district managers are required to hold at least one meeting a month (or more, if necessary) with their chief operators and supervisors, and take up the work in detail, including the results of service tests in their districts, and in short everything concerning the service that they deem advisable.

(To be continued.)


KEYSTONE TELEPHONE CO. OF PHILADELPHIA.

SUPERVISION TEST. EX. _____

Opr. _____ Opr. No. _____

Form Used for Supervision Tests. Ruled on Sheet 9¼ x 6 Inches in Size.

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IN THE OPERATING FIELD

THE GROWTH OF AN INDEPENDENT TELEPHONE COMPANY IN IOWA.

BEGINNING in 1894 with the crude apparatus and instruments which were then furnished by Independent manufacturers, the Cedar Rapids & Marion Telephone Company, of Cedar Rapids, Ia., started with 350 subscribers, and in spite of the methods used by the opposition in cut rates and free service, there has been a steady and healthy growth, brought about by good service and strict attention to business. In 1903, the system was changed from overhead construction to the underground plan of distribution. The entire operating system was also changed from magneto to full central energy, with a switchboard equipped for 1,500 lines, and having a capacity of 3,000 lines. A new three-story telephone exchange building 40 x 110 feet was built on the Roebling system of fireproof construction. The lines have been extended and the subscribers' list added to, until now there are over two thousand five hundred telephones connected with the switchboard, the company employing thirty operators in the exchange and a force of clerks, inspectors, trouble men and other regular employes to a total of sixty.

The company was originally capitalized at $50,000, which was considered at that time to be all that was necessary, but in 1901 it was found necessary to increase the capitalization to $150,000, again in April, 1905, the company was obliged to further increase the capital to $300,000, $192,000 of which is now paid up. The total investment in the property at the present time amounts to $304,859.

In April, 1905, the entire property of the Linn County Telephone Company, including the exchanges at Marion, Central City, Center Point, Coggon and the toll lines connecting all other towns in the northern part of Linn county and reaching Anamosa, Monticello and Manchester were purchased. There are now thirteen hundred and eighty-seven subscribers in Linn county outside of the Cedar Rapids exchange.

TERMS OF LIMITED FRANCHISE GRANTED TO BELL COMPANY IN WABASH, IND.

REPRESENTATIVES of the Central Union (Bell) Telephone Company have within a few months publicly stated both at Lebanon and at Richmond, Ind., that their company never has accepted, and would not accept a franchise containing a limitation in rates.

Investigation by the Indiana Independent Telephone Association brought forth the fact that such a franchise had actually been granted in Wabash, Ind., over a year ago, and copies of the documents proving this have been published in the September Bulletin of the association. In a franchise granting the company the right to erect and maintain its plant for a period of fifteen years is incorporated the following clause:

"Section 5. It is made a condition of the existence of any privilege under this Ordinance that the maximum rate which shall be charged any citizen of the City of Wabash for telephone service, which shall include every charge for the instrument and service, shall be, if for a dwelling house the sum of one dollar and fifty cents ($1.50) per month, and for any other purpose and use the rate and price shall in no case exceed two dollars ($2.00) per month. And no higher price shall at any time be charged, either directly or indirectly."

The acceptance of this franchise is worded as follows:

May 22, 1905.

To the Honorable Mayor and Common Council of the City of Wabash, Wabash County, Indiana:

Gentlemen—The Central Union Telephone Company hereby accepts the ordinance (entitled "General Ordinance No. 6, 1905"), passed and approved by you May 22, 1905, granting it the right to erect, maintain and operate its poles, wires and fixtures in the streets, alleys and highways of your city for a term of fifteen (15) years, on the terms and conditions therein stated, and herewith files this, its unconditional acceptance of the terms thereof, in the office of your City Clerk. Respectfully,

(Signed) CENTRAL UNION TELEPHONE CO.,
By H. F. HILL, Second Vice-President.

Attest: W. S. CHAPMAN, Secretary.

Now that the Independent telephone companies are so well organized it is rather unusual for any statement which is intended to deceive the public to remain long unchallenged. The present instance seems to show the Central Union in the position of the man who was "caught with the goods."

NEW YORK CITY CAN FIX RATES.

ACCORDING to an opinion rendered the Board of Estimate and Apportionment of New York, by the Corporation Counsel, concerning the application of the Atlantic Telephone Company for a franchise, New York City not only has the right to grant franchises, but may name the price and fix the ratio of charges.

In this opinion the Corporation Counsel says that the State through its Legislature has the right to grant franchises, and can delegate such power to a municipality.

The telephone company is incorporated under the laws of transportation, and under the provisions of this act the consent of the city is necessary before a franchise be granted. The opinion continues:

"By the powers of the Greater New York Charter the State has clearly delegated to the municipality the power not only to grant franchises, but to prescribe the terms and conditions, and among such delegated powers is that of prescribing the rates which shall be charged by public service corporations obtaining such franchises."

BOOK REVIEW.

THE MANAGEMENT OF ELECTRICAL MACHINERY. By Francis B. Crocker, E. M., Ph.D., and Schuyler S. Wheeler, D.Sc.; 223 pages and 131 illustrations. Published by the D. Van Nostrand Company, 23 Murray and 27 Warren streets, New York. Price $1.00.

This is the sixth edition of the book, which originally appeared under the title of "Practical Management of Dynamos and Motors." It gives very careful detailed instructions for the selection of dynamos and motors, including a reference to the features which make various types of machines best suited to stated classes of work. It takes up in detail the various things which should be known by the men who have to do with the installation, running, testing, etc., of these machines.

The chapters devoted to the localization and remedying of troubles are of the utmost value to the practical operating man, owing not only to the information which they contain, but also to its arrangement. The authors divide the effects produced by various troubles which are likely to occur in generators and motors into ten classes, which are named. Under the headings supplied by these names are taken up the symptoms by which each of the different causes of trouble producing a specified effect makes itself known and the remedy is described.

The closing chapters of the book give specific directions for setting up and operating various standard types of dynamos. It is to be regretted that the authors have not seen fit to devote one chapter to the special types of machinery used in telephone exchanges as they have to railway motors. In its revised form this book has been brought up to date by the omission of some

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parts relating to machines no longer in common use, and by the addition of much new matter in the way of text and illustrations relating to apparatus of recently developed types.

ANNUAL MEETING OF THE RAILWAY SIGNAL ASSOCIATION TO BE HELD AT WASHINGTON, D. C.

THREE sessions are to be held by the members of the Railway Signal Association when they meet at Washington, D. C., on Tuesday, Wednesday and Thursday, October 16th, 17th and 18th respectively. On the first day committee reports will be presented as follows:

Standard specifications for all-electric interlocking and material for construction work; standard specifications for mechanical interlocking and material for construction work; installation, maintenance, etc., of storage batteries; how to remedy the effects of foreign currents on automatic block signals.

An amendment to the constitution relating to the conditions of membership will be considered.

On Wednesday committee reports will be presented as follows: Rubber covered wire; signal lamps—design, oil used in, care of, etc.; committee on interlocking and block signals; circuits for automatic block signal systems—steam, elevated electric and surface electric roads; what shall constitute cost in estimates for installation and record of maintenance; circuits for interlocked signals.

Members of the Association will read papers upon the subjects of "Devices to keep railroad switches from becoming clogged with snow and ice," and "The optics of the signal lens."

Advance copies of reports and papers have been sent out by the secretary, and it is hoped that there will be a large attendance and full discussion.

SCHEDULE OF FALL MEETINGS OF INDEPENDENT OPERATORS IN OHIO DISTRICTS.

THE dates and places for fall meetings of the several districts of the Ohio Independent Telephone Association have been announced for October by President Frank L. Beam. These meetings have been very interesting in the past and are expected to prove of great interest and benefit to the Independent movement this year. The dates are as follows:

District No. 1.—E. G. Miller, vice-president, Warren, Ohio, October 16, 10 a. m., Electric Building, Cleveland, Ohio. Counties—Erie, Lorain, Cuyahoga, Huron, Medina, Lake, Geauga, Ashtabula and Trumbull.

District No. 8.—R. E. Hamblin, vice-president, Toledo, Ohio, October 17, 10 a. m., Boody House, Toledo, Ohio. Counties—Williams, Fulton, Lucas, Ottawa, Sandusky, Seneca, Henry and Defiance.

District No. 7.—G. H. Metheany, vice-president, Lima, Ohio, October 18, 10 a. m., Lima House, Lima, Ohio. Counties—Marion, Wyandot, Hancock, Putnam, Paulding, Van Wert, Mercer, Allen, Auglaize and Hardin.

District No. 9.—Dwight E. Sapp, vice-president, Mt. Vernon, Ohio, October 23, 10 a. m., The Telephone Exchange Building, Mansfield, Ohio. Counties—Crawford, Richland, Ashland, Wayne, Holmes, Morrow, Knox, Union, Delaware, Licking, Franklin, Fairfield, Hocking.

District No. 5.—W. Gilbert Thompson, vice-president, Hamilton, Ohio, October 25, 10 a. m., Dayton Home Telephone Building. Counties—Butler, Warren, Hamilton, Clermont, Brown and Preble.

District No. 6.—I. H. Thiedeck, vice-president, Sidney, Ohio, October 25, 10 a. m., Dayton Home Telephone Building (joint meeting with No. 5). Counties—Green, Montgomery, Clark, Champaign, Logan, Shelby, Darke, Miami and Madison.

District No. 4.—H. P. Folsom, vice-president, Circleville, Ohio, October 26, 10 a. m., Washington Hotel, Portsmouth, Ohio. Counties—Pickaway, Fayette, Vinton, Jackson, Scioto, Lawrence, Pike, Adams, Highland, Clinton and Ross.

District No. 3.—J. B. Rhodes, vice-president, Zanesville, Ohio, October 30, 2 p. m., Clarendon Hotel, Zanesville, Ohio. Counties—Coshocton, Muskingum, Guernsey, Belmont, Noble, Monroe, and also Morgan, Washington, Perry, Athens, Meigs and Gallia.

District No. 2.—W. F. Laubach, vice-president, Akron, Ohio, October 31, 10 a. m., McKinley Hotel, Canton, Ohio. Counties—Summit, Portage, Mahoning, Stark, Columbiana, Carroll, Jefferson, Harrison and Tuscarawas.

EXTENDED TELEPHONE SERVICE AT THIS YEAR'S VANDERBILT CUP RACE.

(*Continued from page 237.*)

possible to do so spare trunks upon the regular open wire lines of the telephone company were brought into service. In some cases it was found by the traffic department to be possible to discontinue the use of certain trunks for regular traffic, and these were cut at both ends of the stretch available for the special automobile race system, and this portion was used during the race. The balance of the distribution was effected by the use of a twisted pair insulated wire. This was simply run loose over the cross-arms of the poles used for the regular open wire leads. These circuits were protected only at the end, where connection was made with instruments of the switchboard at the official stand. Here there were provided regular carbon plate and heat coil arresters with a buried ground. No arresters were installed at the instruments in boxes on poles opposite the course on account of the difficulty and expense of making satisfactory grounds. The company preferred to take the chance of there being no danger from lightning.

Although not a single trouble with this system was experienced during either the elimination race, which was run about a month before the final, or in the contest for the Cup, in which all cars were entered, every precaution was taken for the immediate repairing of any breakdown which might occur. Nine experienced troublemen were stationed at various points along the course, provided with repair kits and motorcycles. Upon the failure of any station to make its reports the nearest troubleman would have been warned of the delay and would then proceed to the silent station to ascertain the cause of the trouble and remedy it.

The magnitude of this special service installed for use upon only two days, and in fact practically for service upon one day, that of the Vanderbilt Cup Race, is indicated very clearly by the figures showing the circuit mileage for various classes of construction. The checking and timing system and pay-station trunk and newspaper private line system lead in the aggregate 448 miles of circuit. Four miles of 26-pair lead-covered cable, two miles of 16-pair lead cable and seven miles of twisted pair wire were installed temporarily. This gave a total of 156 miles of circuit which was temporarily placed. Of the existing circuits of the company, 292 miles of circuit were temporarily connected into this system. The mileages of the various subsidiary divisions comprised in the total system were as follows: Timing and checking system, 78 miles; pay station and trunk system, 155 miles; newspaper and emergency systems, 215 miles.

RAPID GROWTH OF INDEPENDENT COMPANY COMPELS USE OF NEWSPAPER FOR DIRECTORY.

WITHIN the last two years the number of subscribers connected with the exchange of the Dixon Home Telephone Company of Dixon, Illinois, has doubled, and so rapid has been the growth that the company has from time to time resorted to the device of publishing lists of new subscribers in the local newspaper.

In 1897 The Lee County Telephone Company was organized and at once began the construction of an exchange in Dixon. This exchange was operated until 1904, when it was purchased by The Dixon Home Telephone Company and the system entirely rebuilt. The number of subscribers increased last month from 1,200 to 1,300 and the rate of growth is constantly increasing. At the present time in the city of Dixon there is a Home telephone for every ten inhabitants, and in the territory outside of the city reached by the lines of the company it is said that in three out of every four farm houses one will find a Home telephone.

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THE EDITOR'S PAGE

A PRACTICAL EMPLOYMENT TEST.

HOW often does a subscriber get the wrong number when he is confident that he has correctly stated his call? Perhaps not a great many times, but it does happen, and a fidence in the operator.

When a wrong number is given the fault rests, in the majority of cases, with the operator and is due to her failure to hear the words of the subscriber correctly. George A. Scoville tells of a very interesting method of testing out applicants for a position as operator which bears on this point. An experienced manager, in discussing methods of lowering the numbers of such errors in his exchange, said: "When a girl applies to me for a position I engage her in a conversation and, without attracting her attention, turn my back on her and commence to question her pointedly. Fully fifty per cent of the applicants will ask for a repetition of one or more of the questions. This is not a test on the hearing alone, but a great many people unconsciously depend on the facial expression and movement of the lips of the speaker, as well as their ears, to interpret a conversation. Applicants who cannot hear distinctly an ordinary conversation when my back is turned to them, do not secure a position, and I seldom hear of a complaint of this kind."

LONG RANGE ECONOMY.

NOT even yet, apparently, have the men who are building our telephones exchanges learned to look far into the future with a confident spirit. They will talk prosperity, get together in conventions and tell how rapidly the business is growing, and say that the possibilities are boundless—and then go home and add enough switchboard to take care for a few months of as many new subscribers as walk into the office and demand telephones.

Now the business is growing, and the growth is rapid. What is more, it is substantial and not at all in the way of a "boom"—which is liable to collapse in a year or two and ruin those who have built large plants. The solid character of the enterprise is shown by the steadiness with which the ratio of new installations to connected stations has increased from month to month, and from year to year. Better than this, even, is the fact known by experience, that no matter what may happen, when once a telephone has been installed it is almost sure to remain after nearly all other things of equal cost have been cast aside. Its recognition as a household and business necessity has come to the public. Confidence in the future of the telephone systems then is not likely to be misplaced. The sentiment in favor of extension of facilities is strong, and full advantage of it should be taken by those who are in a position to do so.

This does not mean that when an exchange manager has to add to his cable plant or to the capacity of his switchboard he should plunge his hand into his pocket, take account of the amount of cash which he finds and start out to spend it, proud of being able to afford so good an exchange as it will buy, and sure that the time will come when every wire he buys will have attached to it a telephone in the home of a subscriber eager to praise his superior service. On the contrary, it means that he should not spend a cent nor make a contract to buy the material to equip a single line until he has made not only one estimate, but several estimates. When he has finished his figuring he ought to know very closely how his profits in each one of a definite number of the months or years to come will be affected by installing additions of the various sizes he has considered. If he is sure of his data, and sure that he can make good on service—and this is a thing of which every man can be sure if he has the will to do it—then there will be no question of the proper size of the addition which is to be made. Let it be the one which will show the biggest profit at the end of the longest period considered.

This is so obvious a proposition when stated in its simplest terms that every telephone manager will agree to it. That it involves much hard work in delving into the details of the investigations necessary to make such estimates accurate is no objection to the plan, for it is agreed that this work will produce a good profit.

The most serious obstacle to the carrying out of construction in accordance with the plan which would be determined by such an estimate, taking in the initial cost, interest on investment in and depreciation of idle plant, etc., is the first of these three items. It seems as if by the time a manager had gone far enough into the subject to find out what plant would pay a profit some time hence, and to convince himself of the truth of his figures, he ought to have enough power of persuasion to get some money to put into building.

The thing to do is to put the money into the plant now and let it begin to earn a profit. The things which are to be reckoned in an estimate as making it more profitable to install a fairly large amount of equipment at one time are the economies which can be effected in the matter of labor, repairs to building and incidentals. It is also necessary to figure on the value of the freedom from interruptions of service secured by concentrating all the work into a comparatively brief time, instead of keeping the subscribers annoyed by repeated breaking or short-circuiting of wires.

Upon the opposite side of the sheet come most prominently the before mentioned items of interest and depreciation, and, of course, the possibility of improvements in the art which will render obsoltet certain types of apparatus or methods of construction and installation. The manager who can find out for what period of time these items so range themselves as, with the rate of growth which is possible for his plant, will give the greatest percentage of profit, will have the entire secret of success. It takes hard work and careful study, but no construction should be undertaken until there is a feeling that the plans for it actually do come up to this standard.

THE TELEPHONE AND THE VACATION.

WHEN sharp autumn days come many a business man finds his attention wandering from his desk to the woods and fields. There's nothing to compare with the happiness that comes to the man who is out for good shooting on a frosty morning. Still, for the business man there's always the risk. The birds are far away, and something might happen at the office.

Since the telephone lines have gone out to the most remote settlements, and along the winding country roads to the most sequestered farms these business risks have been very much reduced. Where it used to be possible to take only a day's trip, and perhaps out of the question to throw off all of the care which makes the effect of such a trip so wholesome, a man can now receive a message from his office at almost any place, and instantly give directions. The telephone helps the vacation proposition immensely.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

TAX ON POLES LOCATED ON PRIVATE COMPANY'S ROAD.

The turnpike to the south of this city is owned entirely by the turnpike company, and we do not understand that the township through which it passes has any property rights over it. Nevertheless, the township has imposed a license tax upon our poles and we would thank you to inform us whether they can do so, considering who owns the road. H. S. T.

IT has been held that the ownership of a road by a turnpike company does not interfere with the right of the borough to levy a license tax upon poles and wires situated on the turnpike. The purpose of the license tax must be to defray cost of inspection by the municipality. The theory is that the municipality has a right to inspect the poles and wires to see that they are in proper and safe condition, and to pay for the expense of such inspection, and levy a license tax upon the property of the telephone company subject to inspection, wherever located. Norwood Borough v. Western Union Tel. Co., 25 Pa. Super. Ct. 406.

WHEN EXEMPTION FROM TAXATION IS INVALID.

Some time before our company got its franchise from the city, an ordinance was passed imposing a license tax on poles and wires of "all telephone and telegraph companies doing business therein." In the ordinance granting our franchise we agreed to give the municipality free telephones in all of the public buildings and permit them to use our poles for their fire alarm system. In consideration of this the franchise allowed us to be exempt from taxation and special assessment during the whole continuance of our company. Now the city is trying to collect a license tax on poles and wires imposed by the old ordinance. Can this be done? Is it not true that our franchise is a binding contract, and also that the ordinance giving us our franchise repeals the ordinance imposing the license tax? H. P.

THE law does not seem to be as you understand it. A municipality has no power to exempt a telephone company from charges arising from the exercise of the police power. Hence the clause in your franchise exempting you from taxation and special assessment is void and of no effect, and does not relieve the company from the operation of the previous ordinance imposing the license tax. The only way for you to avoid the payment of the license tax is to induce the city to repeal the ordinance imposing it. You might, of course, show that the tax is unreasonable, or that no inspection of the poles has been made or expense incurred by the city. See Braddock Borough v. Alleghany Tel. Co., 25 Pa. Super. Ct. 544.

CONSTRUCTION OF CONTRACT WITH CITY INVOLVING TAXATION.

FOR some time prior to October 16, 1888, the Cumberland Telephone & Telegraph Company had maintained and operated in the city of Nashville a telephone exchange under a revokable license. On that day the Mayor and City Council passed an ordinance granting the company the right to erect and maintain a telephone plant in the city. The ordinance contained a provision that the company should pay to the city annually the sum of $1 on each box in use by it "in lieu of all other taxes except water tax." By another section the city was given the right to string the wires for the maintenance of its fire alarm system on the company's poles. Since that time the company has paid the $1 per box and also the general taxes assessed upon its real estate and office furniture. For a number of years prior to 1900, the city Board of Assessors, in pursuance of a general law of the state, assessed the distributable property, the poles, wires and accessories, according to its value and taxes were laid thereon, but the company declined to pay them. The city brought suit against the company and in defense the company contended that the city was not entitled to collect anything except the $1 per box tax, and water taxes, by the terms of the ordinance granting the franchise. The contention of the city was that it did not intend to grant the company immunity from general taxation, but only from such as the city itself had authority to impose. The contention of the city was sustained by the Circuit Court of the United States. For this decision three reasons were given. The first was that the charter of the city provided that the municipality should not exempt any property from taxation not exempt from state taxation. The second was that there were various local taxes or charges to which the company was liable to be subjected by the city, and that the ordinance should be construed as intending to cover such taxes. The third reason was that the parties, having used the word "taxes" in the ordinance, intended to mean the compensation to which the city was entitled for the privilege of occupying its streets with the structures of the company. Mayor of Nashville v. Cumberland Tel. & Tel. Co., 145 Fed. 607.

LINEMEN ONLY FELLOW SERVANTS WITH THOSE CONCURRENTLY EMPLOYED.

THE linemen employed by an electric company were the inspectors and repairers of poles. A pole which was defective when put up at the time of the original construction of the line of wiring broke, injuring a lineman. The defect was not discoverable by the ordinary tests, such as sounding it. The injured lineman brought suit against the electric company. The defense was that the company was relieved from liability because the negligence was that of a fellow servant of the lineman. The Supreme Court of Michigan held that the lineman was not a fellow servant of the workmen who originally erected the pole. There was no showing that the lineman had been in the employ of the company at the time the pole was originally set. The pole broke when a feed wire was being strung along it and the plaintiff was actively engaged in stringing the wire. This the court held did not show that he was negligent in assuming that the pole would stand the strain, but that whether the breaking was caused by stringing the wire in a negligent manner was a question for the jury. Judgment in favor of the plaintiff was affirmed. Livingway v. Houghton Co. St. Ry. Co., 108 N. W. 662.

INJURY FROM SAGGING WIRES.

EMPLOYEES of the Southern Bell Telephone and Telegraph Company while engaged in stringing wires in Rome, Ga., made use of a windlass, from which a wire was run to a cross-arm at the top of a pole. A pedestrian crossing the street was hit in the face by the sagging wire, whereupon he caught the wire in his hand. He was unable to release his hold and was seriously burned and injured.

The injured man brought suit against the company and the court affirmed a judgment for the plaintiff, holding that it was not negligence for a pedestrian to cross a public street at a point where there is no cross walk. In doing so he may "assume a greater risk from passing vehicles and animals using the main thoroughfare than he does when passing over a cross walk, but he does not in so doing, assume any greater risk from obstructions other than those necessary for the use of some public utility, such as water plugs, telegraph and telephone poles and the like. Even a telegraph or telephone wire, placed so low on a sidewalk or street that a person using the street might come in contact with it, would be an obstruction." Southern Bell Telep. & Teleg. Co. v. Howell, 53 S. E. 577.

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TELEPHONE PATENTS

DESK TELEPHONE.

Stephen C. Houghton, Rome, New York, patents (No. 827,692; dated July 31, 1906; filed Oct. 23, 1905; serial No. 283,909) and assigns to The Wire & Telephone Co., of America, a desk telephone.

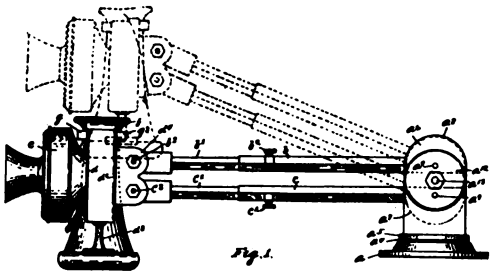


Fig. 1.

Referring to the illustrations, Fig. 1 is a side elevation and Fig. 2 is a longitudinal vertical section of the instrument. A pair of tubular supporting arms *b* and *c* are pivoted to a fixed base, which is fastened to the horizontal top of the desk. At the extremity of these arms is mounted a switch box for the hook switch and the usual transmitter and receiver. The conducting cord is led through the tubular arm *c*. The inventor claims that the telephone equipment at the end of the arm will always be supported in a vertical position. A telescopic con-

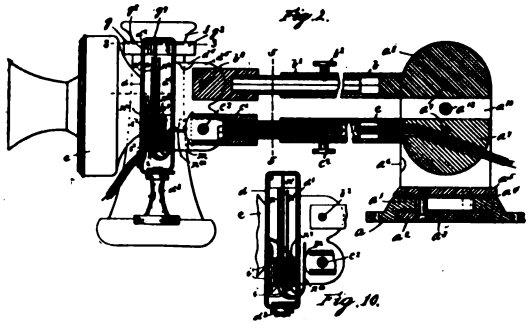


Fig. 2.

struction of the tubular arms provides for longitudinal extension.

POLE ERECTING MACHINE.

John Riddall Brown, Manchester, England, patents (No. 826,708; dated July 24, 1906; filed December 15, 1905; serial No. 291,865) means for laying or erecting telegraph and like poles.

A stand supports a table provided with clamps designed to grasp the pole and hold it firmly in place. Pivoted near the bottom of the stand is an erecting arm terminating at its further extremity in a forked cradle for the shaft of the pole. The butt of the pole is first lifted and firmly clamped to the table while its smaller end rests on the ground. By the operation of a winch on the stand the table is tilted and simultaneously the extremity of the erecting arm is elevated, thus raising the pole to a vertical position.

MEANS FOR SPLICING POLES.

John D. Soseman, Monroe, Wis., patents (No. 826,124; dated July 17, 1906; filed Sept. 2, 1905; serial No. 276,861) a means for splicing telegraph, telephone and other poles.

In order that it shall not be necessary to replace an entire pole when only the lower portion is decayed, the inventor provides means which he claims will facilitate the removal of the decayed lower portion and the splicing of the pole to a new stub. A support having three or more legs is clamped to the pole a few feet above the ground. The lower portion of the pole is then sawed off and after it has been dug up and removed a new stub is put in place and spliced to the upper part of the pole.

PARTY LINE SYSTEM.

Alexis Marchand, Buckingham, Washington, patents (No. 831,364; dated September 18, 1906; filed September 5, 1905; serial No. 277,017 and assigns one-half to James B. Valentine, Bridgeport, Washington, a selector or lock-out for party-lines.

A selective party line lock-out system is described. At each station are provided a number of keys, cams, a drum, ratchets, etc., for accomplishing the results desired by the inventor.

INDUCTIVE TELEPHONE SYSTEM.

Charles Vernon Beaver, Anita, Ia., patents (No. 826,220; dated July 17, 1906; filed July 5, 1902; serial No. 114,518) a telephone system.

A main line is provided extending through a number of substations but having, ordinarily, no direct connection with any of them. At each substation the receiver and signal receiving circuit is parallel and in close proximity to the line wire, so that current may be induced in this local circuit by current in the line. Switches are provided which enable the subscriber to connect his generator and his transmitter directly to the line.

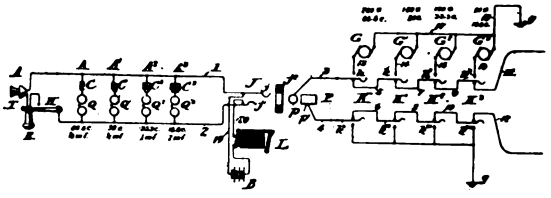
TELEPHONE-INDEX.

George B. Adams, Chicago, Ill., patents (No. 828,914; dated August 21, 1906; filed Dec. 5, 1905; serial No. 290,476) a telephone-index.

This index is intended to be attached by the telephone subscriber to the mouthpiece of his instrument. It consists of a loop or coil of wire which grips the mouthpiece and carries a number of cards which are held suspended beneath the mouthpiece and are intended to receive the telephone numbers which the individual subscriber desires to have conveniently at hand.

HARMONIC PARTY LINE SYSTEM.

William W. Dean, Elyria, Ohio, patents (No. 827,087; dated July 31st, 1906; filed Aug. 9, 1905; serial No. 273,456) and assigns to the Dean Electric Co., Elyria, Ohio, a harmonic signaling for party-lines.



The inventor provides a harmonic party-line system in which the bells of the high frequency section will not respond to current intended for bells of the lower frequency. He provides that the current for the high frequency bells shall be of a corresponding high voltage, and that the bells for the low frequency shall receive current at lower voltages; thus current which is intended to actuate a lower frequency bell will not be of a voltage sufficiently high to ring a bell of a high frequency. The system is

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very well illustrated in the figure. The generators with their voltages and frequencies are shown at G, G^1, G^2, G^3 and the party line with its bells at A, A^1, A^2, A^3. A condenser is provided at each ringer, the capacity of these condensers being inversely proportionate to the frequency to which their corresponding ringers are tuned.

TELEPHONE APPARATUS.

David H. Wilson, Chicago, Ill., patents (No. 830,272; dated Sept. 4, 1906; filed January 2, 1906; serial No. 294,251) and assigns to Robert Bines, Chicago, Ill., a telephone apparatus.

In an attempt to do away with interference with transmission from inductive disturbances on the line, the inventor places both the transmitter and receiver in local circuits. At each station he provides an induction coil or induction coils of special form which embody windings for both of the local circuits referred to and also windings in series with the line.

CABLE.

Walter C. Yeatman, Chicago, Ill., patents (No. 831,131; dated Sept. 18, 1906; filed June 13, 1903; serial No. 161,334) and assigns to American Telephone & Telegraph Co., New York, a multi-conductor-cable.

The object of the inventor is to provide a cable adapted for the operation of phantom circuits, which shall have advantages for ordinary telephone work. Two twisted pairs, consisting of

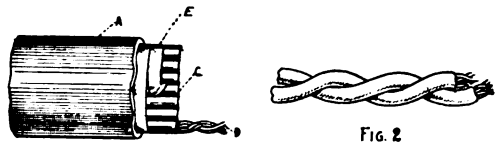


FIG. 2

FIG. 3

four conductors, are shown in Fig. 3. The individual conductors are twisted in opposite directions, as, for illustration, pair AA' might be twisted to the right and pair BB' twisted to the left. These pairs may be twisted together in either one direction or the other. It is claimed that in the process of twisting the different pairs together it is possible to change the pitch, increasing the pitch of one pair and decreasing the pitch of the other, and in this way that objectionable induction between different pairs is prevented. Fig. 1 shows a completed cable constructed in accordance with this system.

SECRECY LISTENING KEY.

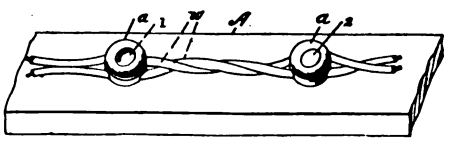
William Milton Brown, Johnstown, Pa., patents (No. 824,843; dated July 3, 1906; filed June 26, 1901; serial No. 66,094) and assigns one-fourth to George H. Parmelee, Johnstown, Pa., an operator's key for telephone switchboards.

To prevent the operator from overhearing the conversation the inventor provides a special key which in its normal position completes a circuit between the two subscribers, which does not include the operator's telephone equipment. By throwing the key to one side, the operator may speak to either one of the subscribers.

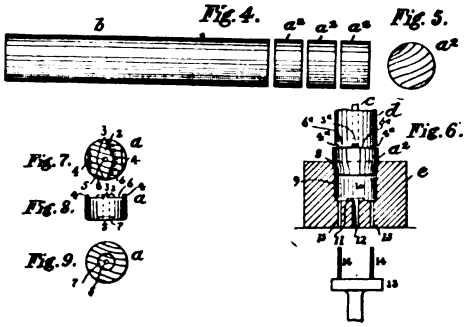
COMPRESSED CLEAT.

Charles C. Blake, Brookline, Mass., patents (No. 825,954; dated July 17, 1906; filed Oct. 27, 1905; serial No. 284,634) a cleat for electric wires.

Fig. 1.



This patent covers a method of making cleats for fastening electrical wires by compressing wood. In Fig. 1 the cleats are shown in use. The method of making them will be readily understood by reference to the other figures. A circular cylinder of wood shown in Fig. 4 is cut into sections a^2 of the required size. The sections are then compressed and formed into cleats by means of the die shown in Fig. 6. In Fig. 6 the cleat in section a^2 is shown in the act of being forced in the die which gives the necessary grooves, at the same time compressing the wood. A hole is then punched in the cleat by a puncher c. The finished cleat is shown in Figs. 7, 8 and 9, which are top, side and bottom



views respectively. To insulate the cleats they are placed in a kettle and submerged in boiling paraffin until the liquid has thoroughly saturated them.

ANTISEPTIC TRANSMITTER.

Everett C. Brewer, St. Louis, Mo., patents (No. 825,635; dated July 10, 1906; filed Jan. 19, 1906; serial No. 296,782) and assigns one half to William H. Nolker, St. Louis, Mo., a telephone transmitter.

In order to prevent germs from lodging in the transmitter, the inventor provides a diaphragm which he places in front of the usual diaphragm. This supplementary diaphragm is held in place by an annular nut. The outer diaphragm is sealed so as to prevent the entering of germs or their lodging in the instrument. The transmit the vibrations without loss.

MUFFLING DEVICE.

Robert A. Walton, Los Angeles, Cal., patents (No. 823,090; dated June 12, 1906; filed July 25, 1905; serial No. 271,230) a telephone transmitter attachment.

A device for rendering a transmitter temporarily inoperative so that user of the telephone may talk to a person at his end of the line without being overheard is described. Two perforated discs are mounted before the diaphragm. The perforations normally register, but may be thrown out by turning the mouthpiece.

TELEPHONE DISINFECTOR.

Nelson J. Tubbs, Louisville, Ky., patents (No. 829,812; dated Aug. 28, 1906; filed May 8, 1905; serial No. 259,461) and assigns one-fourth to Hardin Collings, one-eighth to Frank C. Carpenter, and one-eighth to Walter F. Jones, Louisville, Ky., a telephone disinfector.

Both the receiver and transmitter are equipped with a disinfecting device. For the receiver a cup containing the disinfecting substance is supported so as to receive the larger end of the receiver when it is on the hook. A disinfecting shutter ordinarily covers the transmitter mouthpiece, but is so connected with the switch-hook by a linkage as to be swung clear of the aperture when the receiver is removed from the hook.

TAKE-UP FOR CABLES.

Bernard A. Fuller and Miles Bateman, Centerville, Iowa, patents (No. 828,282; dated Aug. 7, 1906; filed Oct. 27, 1905; serial No. 285,226) a take-up for cables.

A metal plate has hooks on opposite sides turned inwardly facing each other. A metal loop of a semi-circular cross section is also fastened to the plate and lies in the same plane with it or a plane parallel to it. The cable passes under either one of the hooks, about the tree or post, and is brought back through the other hook. After passing about the metal loop, it passes again through the second hook and is firmly held in place at this hook by its first turn.

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QUERIES

GENERATOR NOT UP TO VOLTAGE.—(779.)

We have a ringing machine for delivering pulsating current, belted to a small alternating current motor. It has never given satisfactory results, as it causes the bells to tinkle, but they will not ring sharply. We think the fields are weak and it does not come up to voltage. Can you suggest any way in which we can tell what is the trouble? R. P.

It is very likely that the trouble is simply that the armature of the machine does not rotate rapidly enough. We suggest that you find out what should be the proper speed in the first place to give the correct voltage to ring your bells. This should be furnished by the manufacturer either upon the name plate of the machine or may be obtained from him by asking him to refer to his records. The speed of the machine as it is in actual service should then be taken with a speed indicator. If it is not enough take also the speed of the motor, and measure the diameter of the motor and generator pulleys. A new pulley should be provided on either the generator or motor, of such dimensions as to make the diameters of the two pulleys inversely proportionate to the required speed of the machines. As soon as you have the correct ratio between the pulleys you will probably have no difficulty in getting your generator to ring its bells.

TESTING BAD CORDS.—(780.)

Will you please describe to me the best way to test bad cords in a switchboard. What I want is some method which will enable the night operator to run through them quickly every evening after he has got through the regular rush of operating. B. N.

It is quite probable that you have a noisy line in your exchange, or a line parallel to an electric light circuit. In the latter case, even if the line is quiet, it can be made noisy by taking out the mica between the carbons, or better still by grounding it by a little piece of wire. This will give you a steady hum upon one line. Cords can be plugged into the jack to which this line is connected, and as each cord is plugged in the corresponding listening key should be thrown. The operator should move his hand back and forth along the cord, bending it slightly and twisting it. Any crackling noise will indicate a broken piece of tinsel, and the cord should be marked in some way to indicate that it is defective. One method used is simply to draw the cord partially out of the socket and bend it over and insert the plug, tip downward in the socket beside the cord. The trouble man upon going to work in the morning may withdraw these defective cords and repair them.

THE REQUIREMENTS OF AN OFFICE LINE.—(781.)

Will you kindly explain to me the various purposes which must be attained by a local line in a telephone office, such as a line from a switchboard to a desk. B. N.

Perhaps the best way to answer your question is to take up an actual circuit used for this purpose. The circuit we show is one designed by one of the Bell companies to be used at a desk of the cordless type, as either an incoming or outgoing talking circuit. The relay bridged across the line is of the ring-down type, adapted to be located in the rear of the desk, and to light a line map mounted upon a strip above the keys, by means of which connections are made.

The line lamp is connected to an auxiliary circuit, which rings a buzzer if the switch controlling this circuit is left in the proper position. This auxiliary signal is, of course, only used at such times as the regular operator is absent from the desk, and it is desired to attract the attention of some other person in the room who is so placed as to be unable to see the line lamp when it is illuminated. In order to extinguish the line signal the relay is made to be self-restoring, like an ordinary self-restoring drop. the restoring current being carried to the proper winding upon the operation of a listening key through two local contacts in the circuit shown. As the restoring winding is of low resistance, it was necessary to insert a balancing resistance in series with it, in order that current from a 24 volt battery should not be sufficient to heat up the wire to a dangerous temperature. The condenser is inserted in series with the line coil of the relay in order that the line lamp at the subscriber's switchboard upon which this line terminates may not be kept constantly burning, and that the operator may receive proper supervision.

The function of the springs in the key which are adapted to bring the line wires into connection with the operator's telephone set is obvious. The springs at the other end of this key are adapted to bridge the holding coil across the line. It frequently

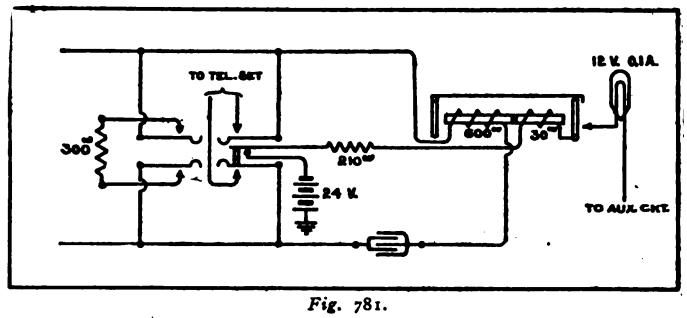

Fig. 781.

is necessary for the operator at a desk to leave one connection and take up another temporarily, but at the same time she must see that the first connection is not pulled down at the subscriber's switchboard. In order to insure this, she connects the holding coil across the line by throwing the key. This keeps the supervisory relay drawn up in the subscriber's cord circuit.

CROSS TALK FROM OTHER COMPANY'S WIRES.—(782.)

We have a grounded line running on poles belonging to another company for about a mile and a half. It is quite a long line, and is only run on the poles of the other company as a matter of convenience, because we do not care to go to the trouble and expense of obtaining right-of-way and erecting poles of our own for this short distance. The lines of the other company are metallic, but they do not seem to be correctly transposed with regard to our line, as we get considerable cross-talk. The other company has also complained of cross-talk, but does not wish to go to any expense to transpose its lines against our grounded circuit. Is there any economical way for us to get out of this difficulty? L. G.

It is probable that by making a portion of your line which runs along the line of the other company metallic and properly transposing to fall in with the general scheme of transposition now in use on these poles, you can avoid the difficulty which is bothering you. We would suggest that you obtain two repeating coils, and cut one in at each end of the stretch where your line is carried on the other company's poles, making the portions of the line between the two coils metallic. The repeating coils may be encased in a water tight box mounted upon the side of the pole. This will enable you to leave all the rest of your circuit single wire until such time as you get enough business to have the circuit changed to all metallic. Such an arrangement will not work if you have too many ringers on the line, but otherwise you will be able to give fairly good service.

TEMPERATURE FOR WAX IN BOILING OUT CABLE.—(783.)

Will you please tell me to what temperature wax should be heated for boiling out switchboard cable? B. N.

The usual method of determining the correct temperature is to lower into the boiling wax from time to time a bit of cloth or a bunch of waste thread. As soon as this begins to bubble immediately after touching the surface of the heated wax the cable may be immersed. It should be left until it has entirely stopped bubbling, and then struck repeatedly upon a piece of paper to remove the greater part of the wax before it hardens.

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FOR SALE

For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE—100 Kellogg telephones, selective ringing, compact style, guaranteed in first-class condition, with or without transmitters and receivers. Sample sent for inspection. Address The Monroe Telephone Co., Monroe, Wis. 698

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

AUTOMATIC ENGINEER—Wanted, bright young man, preferably technical graduate, practical telephone experience, if possible automatic. Good salary, bright future. State particulars. Address Box 678, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 678

WANTED—A thoroughly competent telephone man with eight years' experience in magento system, desires position as repair man and lineman. Will go anywhere. Best of references given. Steady work wanted. Address Adna Miller, New Boston, Ill. 683

WANTED—Whirlwind salesmen. Men who are resourceful, energetic and capable of commanding large salaries; the kind of men who are not accustomed to take "No" or "We will give you an order the next time you are here" for an answer. For such men we have good positions. We are willing that our salesmen should participate in the profit outside of the question of salary. Apply by letter or in person. Address S. A. Duvall, superintendent Long Distance Telephone Mfg. Co., South Bend, Indiana. 694

WANTED---Continued

POSITION WANTED—A salesman who knows apparatus and is a practical telephone man desires position with first-class manufacturing company. Address Box 690, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 690

WANTED—Man to represent us in the State of Maine and surrounding states. One who is thoroughly acquainted with the Independent telephone movement in the state of Maine. Would prefer a man who has some knowledge of the telephone business and has influential friends throughout the State. Apply by letter or in person. Address S. A. Duvall, superintendent Long Distance Telephone Mfg. Co., South Bend, Indiana. 695

WANTED—City Foreman competent to superintend outside construction and locate and repair cable faults. Plant 2,500 subscribers. State experience, reference and salary. Address Box 668, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 668

WANTED—Ambitious telephone accountants to follow up "prospects" in their localities, install office accounting and filing systems. Write us experience, per diem charges, ability, etc. Address The Edwards-Hine Co., Telephone Systemizers, Grand Rapids, Mich. 697

THE Dean Electric Company, Elyria, Ohio, is constantly increasing its works, and always on the lookout for first-class young men, experienced in either factory or outside installation work. Make application by letter, stating age, experience, etc. Address Supt., The Dean Electric Company, Elyria, Ohio. 699

The Debutante.

THE DEADLY PARALLEL

BAIRD FEATURES	"AUTOMATIC" FEATURES
1. Powerful Lever Action.	1. Gravity Action.
2. Cash Register.	2. None.
3. Rejector.	3. None.
4. Sheet Steel Construction.	4. Cast iron and cast lead.
5. One clear signal tone.	5. Various musical tones.
6. All signals loud.	6. Some weak, some loud.
7. One coin at a time.	7. Coins deposited rapidly confuse.
8. Portable sets very light.	8. Portable sets very heavy.
9. Combination lock.	9. Ordinary key lock.
10. Unbeatable signals.	10. Easily beaten signals.
11. With Power improvement and progress are possible.	11. With gravity action progress is practically impossible.

Write for Bulletins Nos. 86 and 51

BAIRD MANUFACTURING CO.

1506 BRIAR PLACE, CHICAGO

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

THE BUILDERS OF DETROIT'S NEW TELEPHONE SYSTEM.

CONTRACTS have within a few days been awarded to the Dean Electric Co., Elyria, Ohio, for the central office switchboards and the sub-station telephones which are to form the equipment of the Home Telephone Co.'s new plant at Detroit, Mich. This was the largest contract for telephone apparatus ever awarded to an Independent manufacturer at one time. The central office switchboards are to form the equipment of the four largest central offices at present being built by the Home Telephone Company. One of these offices, "Main," which is to be located at the corner of Madison and John R. streets, is to be one of the largest telephone exchanges ever constructed and is equalled only by the one recently put into service by the Kinloch Telephone Company, the Independent Telephone Company of St. Louis, Mo. The equipment of this exchange is to consist of 27 sections of common battery multiple "A" board equipped with multiple jack equipment for 8,000 lines and 9,600 answering jacks, besides seven trunking sections, a chief operator's desk, a four position information desk, four position monitor's desk, three position wire chief's and a two position manager's desk. The order also calls for main and intermediate distributing frames, relay racks, duplicate charging machines and duplicate sets of storage battery.

The East exchange is to have a board of 7,200 lines capacity, equipped for 1,300 lines, three incoming trunk sections, chief operator's, monitor's and wire chief's desks, main and intermediate frames and relay racks, duplicate charging machines and duplicate sets of storage battery.

The West exchange is to be provided with a switchboard of the same ultimate capacity as the East office, but equipped for 800 local lines, three incoming trunk sections fully equipped, chief operator's, monitor's and wire chief's desks, main and intermediate frame and relay rack, duplicate charging machines, and duplicate sets of storage battery.

The North exchange, also a 7,200 line board, is to be equipped for 2,400 lines, incoming trunk sections, chief operator's, monitor's and wire chief's desks, main and intermediate frames and relay racks, duplicate charging machines and duplicate sets of storage battery.

All the switchboards include the Dean individual indicating 4-party ringing keys and are to be wired complete for the Dean harmonic selective party line system, metal lamp jacks and spring metal lamp caps.

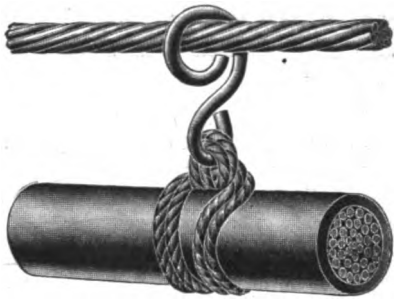
Each position will be provided with test cords and keys for testing line and supervisory relays and cords.

The total amount of the contract for central office and sub-station equipment was nearly $500,000. The Dean Electric Co. was represented by William W. Dean, vice-president, and chief engineer A. E. Barker, secretary and general manager, and Ray H. Manson, engineer.

Every refinement known to the art of telephony will be incorporated in this central office and sub-station equipment and used in conjunction with the magnificent underground system, at present being installed in the principal streets of the city.

Contracts were also awarded at the same time for the underground cables which are to be drawn into the conduits at present being constructed by the Home Telephone Company. The successful firms were the John A. Roebling's Sons Co., of Trenton, N. J., represented by W. P. Bowman, and the Stromberg-Carlson Telephone Manufacturing Co., of Rochester, N. Y., represented by Mr. M. S. Conner and S. W. Menafee.

The actual work of constructing this mammoth plant is under the direct supervision of Mr. W. B. Woodbury, General Manager, and Mr. W. C. Polk, the Engineer of the Home Telephone Co.



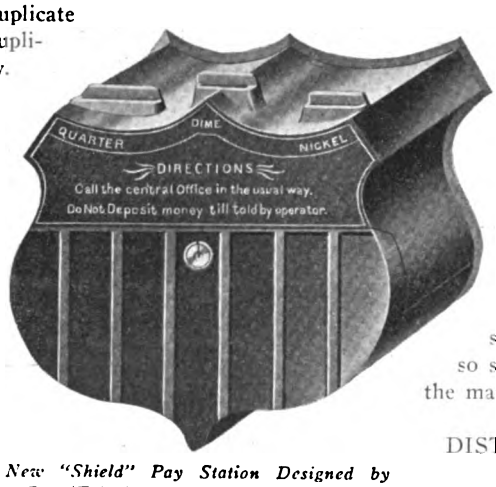
The Pig-tail Cable Hanger, Made by the Yonkers Specialty Company.

A NEW MARLINE CABLE HANGER.

THE "pig-tail" type is the name by which is designated the new marline cable hanger which is being manufactured by the Yonkers Specialty Company, of Yonkers, N. Y. The origin of the name is apparent from a glance at the shape of the hook which passes over the messenger wire and has its end brought under and up.

The company, in the course of its business in the well-known "Metropolitan" cable hangers, became convinced that there is a growing demand in these days of careful construction work for the kind of marline hangers which will not easily come off the supporting strand and which does not have to be pinched on to the supporting strand by the lineman. This new hanger is designed to supply this demand. It is as easy to apply as the ordinary marline hanger, and when in place is held by the marline loop so that the plane of the hook is perpendicular to the strand. In this position it is impossible to detach it, and at the same time the point of the hook is so located that it will not catch wires from the running board and snarl everything up, an accident which often occurs when an attempt is made to add new line wires to a pole line carrying cable.

The factor of safety is very high, as compared to an "s" shaped hook of similar sized wire, and under test hangs on to the supporting wire until the curl of the hook is completely straightened out. The hook is carefully galvanized after being bent, and furnished with a fine grade of house-line. The Yonkers Specialty Company claims that these "pig-tail" hangers have been in service experimentally for several years, and have proved so successful that it feels justified in putting them actively on the market.



New "Shield" Pay Station Designed by Gray Telephone Pay Station Company.

DISTINCTIVE PAY STATION FOR INDEPENDENT TELEPHONE COMPANIES.

THE shield has been adopted as an appropriate design for a telephone pay station in a new model which has recently been patented by The Gray Telephone Pay Station Company, of Hartford, Conn. In shape the face of this pay station corresponds to the Independent emblem, as adopted at the National Convention, and to make the resemblance complete the box is finished in colors.

Although the design of this instrument, which has been very recently brought out, is new, the characteristic features of the other Gray Pay Stations have been retained. The boxes are entirely automatic in action, requiring the user to simply drop a coin in the slot. The signals are sounded automatically by the falling coin. Descriptive folder sent on request.

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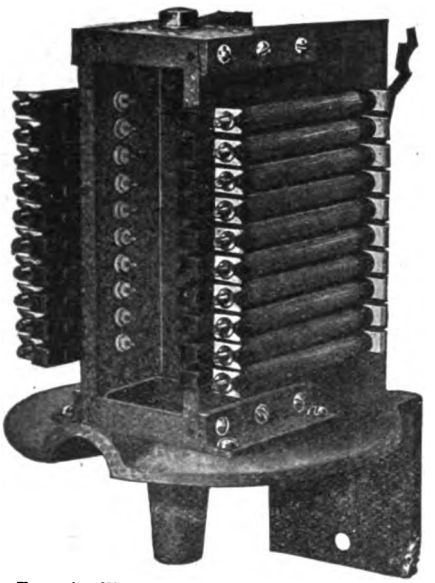
Cook Terminals

and Junction Boxes

are made to fit every possible condition. If you are doing reconstruction work or are putting in an all-cable plant specify COOK terminals, or order direct. Twenty styles in all sizes and at all prices. Equipped with the best and most reliable protection.



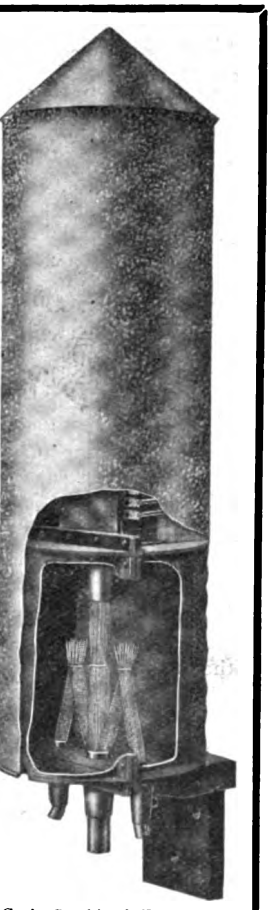
Type S. W.—Inside, Showing Cable Clips.

Better Hurry Your Construction Work Before Winter Sets In.

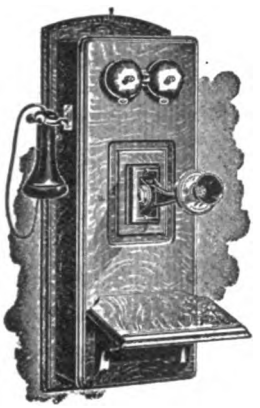
Write for Complete Catalogue with Prices, and Ask for Plans for Your Cable Lay-Out.

Frank B. Cook.

238 W. Lake St., Chicago, Ill. **Manufacturer**



Cook Combined Terminal and Junction Box.



1st

TELEPHONE MADE

with all connecting wires, binding posts and terminal screws fully concealed

To Prevent Trouble

and with no exposed metal parts in the circuit to

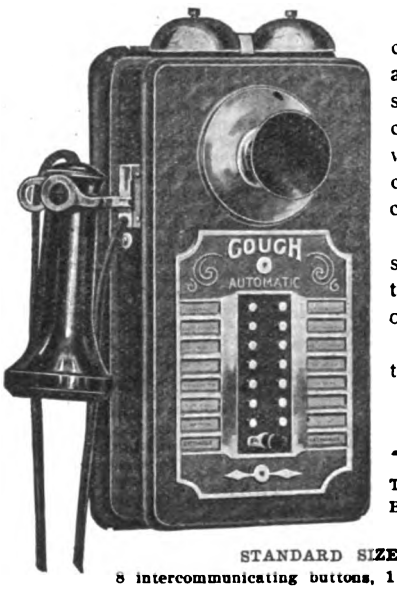
Avoid Danger

from lightning while using the instrument. Send us your inquiry and we will "SHOW-U" at our expense an interesting proposition.

INTERNATIONAL TEL. MFG. CO.

Our Price is Right **Harrison and Clinton Sts., Chicago**

IDEAL FACTORY SERVICE



can only be given with an intercommunicating system. Its value is increased 100 per cent. when any station can be connected to the exchange.

The Couch automatic system with auxiliary trunk buttons is the type of equipment you need.

Let us send you further information.

Trunk Button

Send for Catalogues

STANDARD SIZES:

8	intercommunicating	buttons,	1	exchange	button
14	"	"	1	"	"
18	"	"	1	"	"
24	"	"	1	"	"
28	"	"	1	"	"

100% CHEAPER THAN BRANCH EXCHANGE.

100% QUICKER; 100% MORE SATISFACTORY.

S. H. COUCH CO., Inc., Manufacturers

162 PEARL STREET, BOSTON, MASS.

To the Management of

LARGE EXCHANGES NEW OR OLD COS.

We Solicit Your Contracts for

Telephone Accounting and Filing Systems

and Auditing Work

Our experts will take the entire responsibility of furnishing our perfected copyrighted Blanks, Forms, Records and Supplies at lowest market prices, install the system and educate your office force.

N. B. Services reasonable. Correspondence solicited. Give size and scope of your company and present office conditions.

THE Edwards-Hine Co.

TELEPHONE SYSTEMATIZING DEPT.

5 and 7 PEARL STREET (EAST), GRAND RAPIDS, MICH., U. S. A.

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IN THE MANUFACTURING FIELD

KNIFE SWITCH FAULTS.

IN a perfect switch the blade and jaw must touch at every point, in order to furnish sufficient area for the current to pass between the two pieces of copper without producing heat. This is true because the copper in a knife switch is so proportioned that contact over the entire surface must be made in order to permit the passage of the full amount of current for which the apparatus is designed. Therefore, if the blade does not touch the jaw over the entire surface intended to be brought in contact, the path for the passage of the current is restricted, and a fault will be developed.

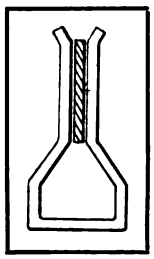


Fig. 1.

The various classes into which these faults divide themselves are very well described in a booklet issued by the Trumbull Electric Manufacturing Company, Plainville, Conn. The illustration in Fig. 1 shows the condition when there is absolutely no contact between the blade and clips, totally preventing the passage of current. This, of course, is hardly ever found in practice, but in manufacturing switches it has been observed that the other faults illustrated are extremely likely to occur. In Fig. 2 is shown the trouble produced by failing to bend the jaws to a position exactly at right angles with the base. This causes the blade to enter at one side, springing the jaw sides apart, and touching their opposite faces at only the upper and lower edges.

Sometimes the jaws are improperly aligned, as indicated in Fig. 3, showing the blade slanting across the jaw, and making contact only at front and back edges. Fig. 4 shows a fault due to improper rolling of the strip copper from which the jaws are made, causing the strips to be slightly concaved. This makes it impossible for the blade to come in contact with the jaws except at the extreme ends. These faults are frequently found in knife switches when first assembled, and are only remedied by skillful and patient work in adjusting the blade and clips to make a perfect fit. The most common of all the faults found in the goods after they reach the customer is the one illustrated in Fig. 5. Seen from above the jaws seem to make good contact with the blade, but, as a matter of fact, in his haste to get through with his work the assembler has not perfected the adjustment, and the lower part of the blade is loose and wholly ineffective.

In order to test a switch for the presence of these faults the Trumbull company suggests that the purchaser attempt to push a narrow strip of paper between the blade and jaw in the spots where he suspects poor contact. Wherever there is room for this paper to be inserted it will be evident that there is no contact, and it is impossible for current to pass. In concluding the booklet the company draws attention to its punched clip switches of the well known type, which although low in price are claimed to be an extremely high grade product. The company will be pleased to forward copy of this booklet to any telephone manager who has occasion to investigate the subject with which it deals.

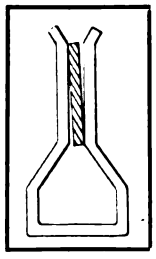


Fig. 2.

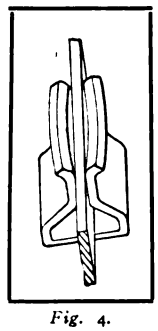


Fig. 4.

THE HOLTZER-CABOT ELECTRIC COMPANY, Brookline, Mass., and 395-397 Dearborn street, Chicago, Ill., in its Bulletin No. 203 describes the transmitters, transmitter arms and induction coils which it is putting upon the market. One of the features of its transmitter referred to in the bulletin is the sealing of the carbon chamber by means of a lava stud, which not only protects the carbon from the effects of moisture, but thoroughly insulates it from the frame. The composition of the material is such that it is said to be unaffected by heat, cold or moisture. Another of the features in favor of this transmitter is the accessibility of all connections on removal of the front of the case. In this bulletin are also described transmitter arms, induction coils and the Universal testing set, which is equipped with a hand micro-telephone, for the use of linemen.

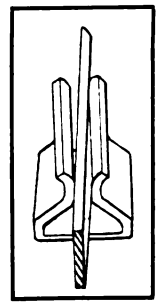
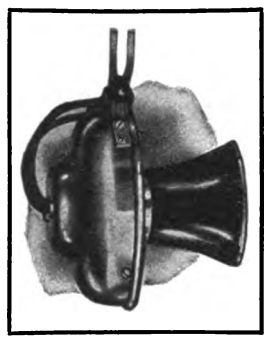


Fig. 3.

THE ELECTRIC MANUFACTURING & EQUIPMENT COMPANY, Atlanta, Ga., is issuing some interesting information about condensers in the form of a seven-page booklet. In addition to general information the company has included descriptions and illustrations of the several types of condensers which it manufactures. These are suitable for installation in common battery or magneto sets, and for mounting upon the wall beside the instrument when used with magneto party lines. Further information can be readily obtained by writing to the company.



Automatic Electric Company's Suspended Type Switchboard Transmitter.

NEW SUSPENDED TRANSMITTER.

THE problem of suspending an operator's transmitter by a device which will prevent wear upon the connecting cords has been solved in an interesting way, as illustrated in the centre of this page, by the engineers of the Automatic Electric Company, Chicago, Ill. This instrument differs in no way from the regular transmitter furnished to subscribers, except in the construction of its back case. It is used in connection with the company's new line of magneto switchboards, which are fully described in the attractive catalogue which the company has recently issued.

THE OLIVER MANUFACTURING COMPANY, Philadelphia, Pa., is distributing a twelve-page folder showing the names of a very large number of the more prominent firms which are using the Equipoise telephone arms. These names include those of the largest and most prominent companies engaged in almost every conceivable line of business, located not only in all the States in the Union but in all parts of the world.

LOW PRICES ON CROSS ARMS.

THE Northern Electric & Machine Co., Brooklyn, N. Y., has three carloads of 10 foot, 10 pin, unpainted yellow pine cross arms in stock for immediate shipment. This concern represents some of the largest mills in the country and is in an exceptional position to supply a high grade material promptly and at lowest prices.

A particularly low price will be quoted on these three carloads. Parties in need of them either now or in the future are advised to communicate with the company. Its advertisement appears on another page.

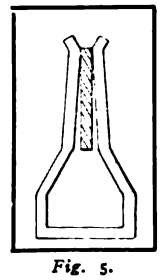


Fig. 5.

THE AMERICAN AUTOMATIC TELEPHONE COMPANY, 200 South avenue, Rochester, N. Y., is making an 800-line automatic switchboard for the Home Telephone Company, of Ironton, Ohio.

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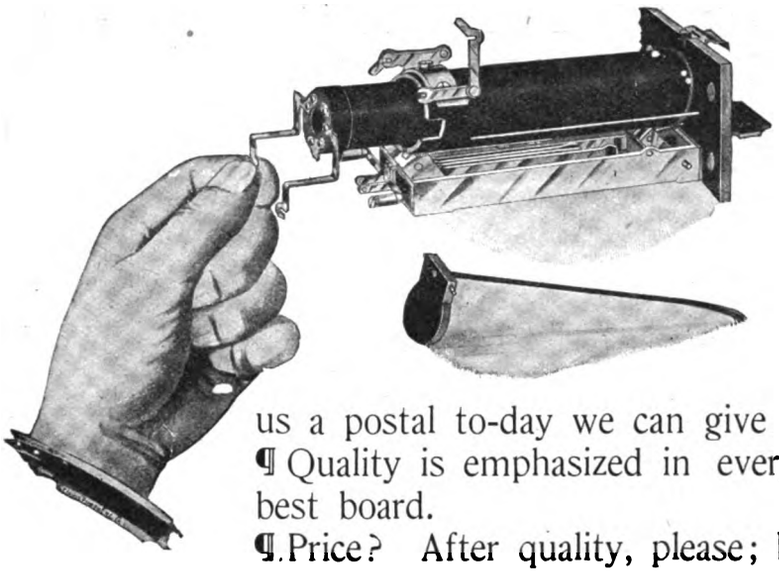
We Do Not Want Your Switchboard Order



¶ If we cannot prove absolutely that our "New Primo" Drop is better than any other you can buy, without regard to price, prestige or any other consideration.

¶ "Hot Air"—not at all, if you drop us a postal to-day we can give you reasons.

¶ Quality is emphasized in every individual part of this latest and best board.

¶ Price? After quality, please; but yours for the asking.

CENTRAL TELEPHONE & ELECTRIC CO.

MAKERS OF HIGH-GRADE TELEPHONE APPARATUS

2131-2133-2135-2137 Lucas Avenue **ST. LOUIS, U. S. A.**

Are You Going to Put in New Poles Soon?

¶ If the old ones had been treated with Avenarius Carbolineum their life would have been doubled and you would be saved all this expense.

¶ Avenarius Carbolineum is a standard preparation used by the U. S. Government and by many railroads and leading telephone companies. Put on with a brush anywhere by anybody.

¶ For further information address Dept. C.

Carbolineum Wood Preserving Co.

MILWAUKEE, WIS.

Sole U. S. Agents

Beware of substitutes offered under similar names for easily discernible reasons

Increases the Toll Revenues

THE CALCULAGRAPH

when once installed in your exchange is always working for you. It times every toll message and never allows an overtime charge to be overlooked.

Makes printed records of time consumed in all toll calls.

IT MAKES NO CLERICAL ERRORS

WRITE FOR BOOKLET

The Calculagraph Company

1487 Jewelers Building NEW YORK CITY

Please mention THE AMERICAN TELEPHONE JOURNAL when writing to ADVERTISERS.

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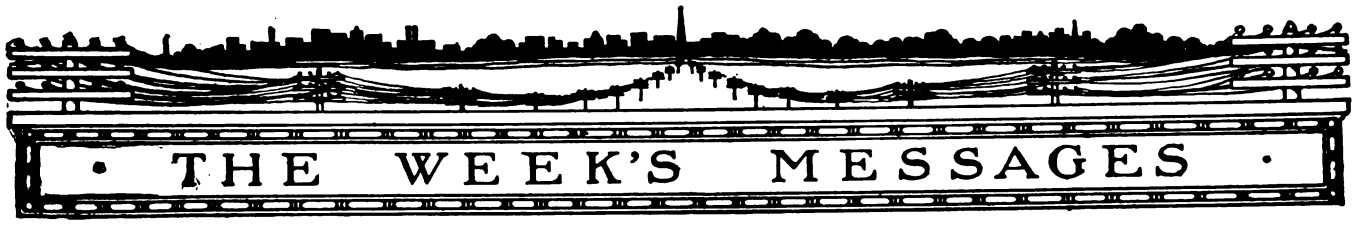

NEW COMPANIES.

BONO, ARK.—The farmers in the vicinity of Bono have organized a mutual telephone company, and have elected the following officers: W. B. Broom, president; Richard Stichman, vice president; P. R. Barnes, secretary. A number of subscribers have already been secured for the company, and lines will be built and an exchange installed at Bono at once.

CAIRO, ILL.—The Cairo and Thebes Telephone Company, of Cairo, Ill., has been organized with the following officers: President, W. W. Wilbourn; vice president, Albert Brawn; secretary, John S. Norman; treasurer, C. C. Miller. About five thousand dollars will be the initial expenditure for the construction of the company's system, work upon which will commence at an early date.

HAMMOND, ILL.—Articles of incorporation have been filed by the Hammond Mutual Telephone Company, of Hammond, Ill. The company's capital stock is placed at $5,000 and the incorporators are Frank P. Smith, S. W. Bandy and C. A. Hacker.

WRIGHTS, ILL.—It is the intention of Barnard Bros. to incorporate their telephone interests at Wrights and Rockbridge, and the new company will be known as the Wrights Telephone Company. The exchange at Wrights now has 200 miles of wire and seventy telephones, representing an investment of $5,000. Additional extensions are planned by the company.

ACKLEY, IA.—Plans are under way for the formation of an Independent telephone company at Ackley, Ia., whose intention it is to establish an exchange at that city, and effect toll connections with all points in Butler, Grundy, Franklin and Hardin counties. In the proposed franchise, which the city council will be asked to grant, it is to be specified that the wires of the new company shall be placed underground in Ackley. Among those associated with local capitalists in the formation of this company are A. T. Whittel, of Waterloo, and C. Dawson, of Des Moines.

BIGTIMBER, MONT.—The Dry Creek Telephone Company, of Bigtimber, Mont., has been incorporated with a capital stock of $10.000. It is the intention of the company to construct a telephone line from Bigtimber to Grey Cliff. The incorporators are F. M. Loup, L. O. Olmstead and J. T. Est, of Bigtimber, and T. V. Overhuls, of Grey Cliff.

ESTANCIA, N. M.—Articles of incorporation have been filed by the Estancia Rural Telephone Company, of Estancia, N. M., and the construction of its lines in that city has already commenced. It is the intention of the company, after the completion of its system in Estancia, to connect all the towns of the county with the county seat. Among the incorporators are J. G. Keen and H. C. Keen.

SARANAC LAKE, N. Y.—The Mountain Home Telephone Company, of Saranac Lake, N. Y., has been incorporated to operate in the counties of Franklin, Clinton, St. Lawrence, Jefferson, Lewis, Hamilton and Essex. The capital stock is placed at $150,000, and the following directors have been elected: Howard Hendrickson, William O. Hendrickson, Henry M. Keys, Frank E. Griffin, William B. Harris, Henry J. Prince, Jr., and Frank E. Derr, of Albany. All of the directors are men connected with the Independent telephone interests of the state of New York.

HAVERHILL, O.—Articles of incorporation have been filed by the Haverhill Telephone Company, of Haverhill, Scioto county, O. The company will commence business with a capital stock of $2,500, and the following are among the incorporators: O. E. Insh, A. S. Goodard, W. A. Brush, H. J. Massie and Henry Folsom.

HOPEWELL, O.—The Indian Camp Telephone Company, of Hopewell, O., has been incorporated with the following incorporators: W. T. Craig, Thomas McMullen, W. N. Neilley, J. C. Tremble and J. C. Rankin. The company has a capital stock of $3,000, and will construct a telephone system in Hopewell.

OKARCHE, OKLA.—The Mt. Pisgah Telephone Company, of Okarche, Okla., has been incorporated with a capital stock of $55,000. The incorporators are Fred H. Smith, John H. Ottis, Daniel Best and Joseph Voss.

MT. PLEASANT, PA.—The charter recently applied for by the Citizens' Telephone Company, of Mt. Pleasant, Westmoreland County, Pa., has been granted. The company will start business with a capital stock of $5,000, and will build lines in Mt. Pleasant township. Among the incorporators are H. E. Keck, W. B. Elliott, Harry Hunter, J. B. Honse, L. C. Fausold, Ellis Adams, Mt. Pleasant; A. A. Beacom, Mammoth, and J. B. Fry and Frank Bork, Welty, Pa.

KEYSER, W. VA.—The Mineral County Division of the West Virginia Mutual Telephone Association has been organized at Keyser, W. Va., with the following officers: J. W. Carskadon, president; J. W. Wagoner, secretary and treasurer; directors, J. W. Carskadon, J. W. Wagoner, S. M. Arnold, J. E. Sheetz, S. L. Twigg, H. L. Welch, A. W. Bane, W. W. Kessner and J. W. Vandiver. The company will construct and operate a line between Keyser and Petersburg, where it will connect with the Mutual Companies of Pendleton and Hardy counties. Branch lines will be built, establishing connections with towns in Hampshire county and east into adjoining counties of Virginia and West Virginia.

FRANCHISES.

UPLAND, CAL.—Bids were opened by the City Trustees of Upland for the telephone franchise recently advertised for sale. Two bids were received, one by C. T. McCulloch, of Upland, and one by W. D. Wynn, of Ontario. The highest bid was made by Mr. McCulloch, being for $750.00, and the franchise will be awarded to him on payment of $650.00, $100.00 having already been paid as a 10 per cent deposit on the bid.

MACKINAW, ILL.—A twenty-five year telephone franchise has been granted by the village board of Mackinaw to the Minier Mutual Telephone Company, of Minier, Ill.

EMPORIA, KAS.—The Kansas City Long Distance Telephone Company is asking the city council of Emporia for permission to establish an exchange in Emporia. Lines have already been built to Osage City, and the establishment of an exchange in Emporia will give service to Kansas City, and will operate a rural party line throughout the county. The company now has connections with over 2,000 towns in Kansas, Nebraska and Missouri, and has over 8,000 miles of copper wire strung. Nearly all towns of importance in Kansas have exchanges, including Abilene, Atchison, Leavenworth, Ottawa, Lawrence, Osage, Burlingame and Topeka.

OMAHA, NEB.—Franchises looking toward the establishment of Independent telephone systems were again presented to the Omaha city council by the Gate City Telephone Company and the Home Telephone Company. It is understood that the Home Company will modify its terms and agree to accept a term of twenty-five years instead of thirty-five, the longer term having been opposed by the councilmen.

LAWTON, OKLA.—A telephone franchise has been applied for at Lawton, Okla., by W. P. Records and others.

SALT LAKE CITY, UTAH.—The Utah Independent Telephone Company, of Salt Lake City, Utah, has secured a fifty-year franchise for the construction and maintenance of a telephone system in the city of Alpine.

FINANCIAL.

MARQUETTE, MICH.—At a recent meeting of the Marquette Telephone Company, held for the purpose of considering the advisability of increasing its capital stock, it was decided to increase it from $60,000 to $100,000.

MINNEAPOLIS, MINN.—The Tri-State Telephone Company has offered for sale $500,000 of its 6 per cent preferred stock, free of tax. The company pays the state a 3 per cent gross earning tax on its entire receipts, which frees the stockholders from taxes. The financial statement of the company shows that after paying all expenses, taxes, fixed charges, dividends and interest, and $200,000 for maintenance and depreciation, the company has a net surplus of $150,000.

ALBANY, N. Y.—The Albany Home Telephone Company has declared its regular quarterly dividend of 1 per cent, payable October 20, to the stockholders of record October 10.

CLEVELAND, O.—A quarterly dividend of 1½ per cent on the preferred stock, payable October 10, and a quarterly dividend of 1 per cent on the common stock, payable October 1 to stockholders of record of September 25, have been declared by the United States Long Distance Telephone Company.

NEWS—WANTED

THE matter contained upon the message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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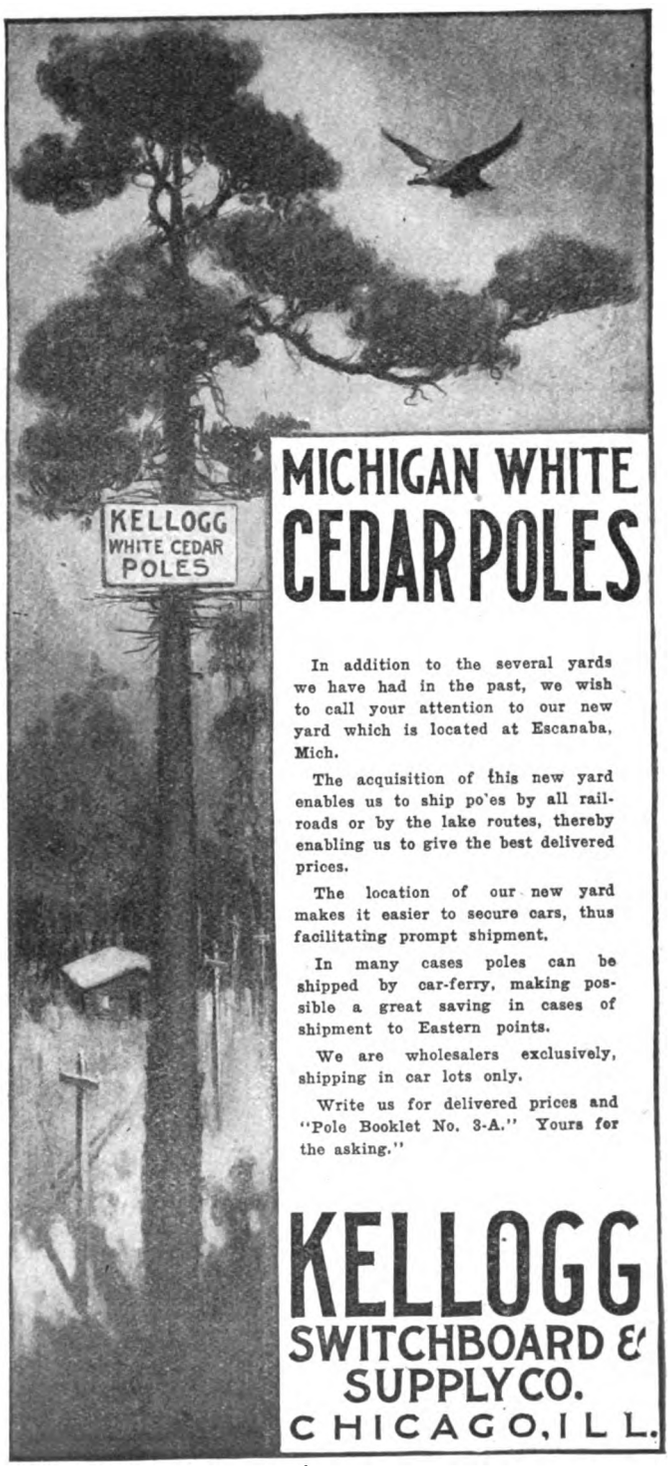

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THE WEEK'S MESSAGES

COLUMBUS, O.—The Board of Directors of the Columbus Citizens' Telephone Company is to decide a quarterly dividend of 1½ per cent on its preferred stock, and a quarterly dividend of 1¼ per cent on the stock of the Franklin County Telephone Company. Both dividends will be payable October 1. Reports of the Citizens' Company will show that the 10,000 mark has almost been reached in the number of subscribers, and it is probable that arrangements will soon be made for a further enlargement of the equipment of the local exchange.

TOLEDO, O.—The Toledo Home Telephone Company has declared its regular quarterly dividend of 2½ per cent. The dividend is payable October 20.

COMBINATIONS.

HUDSON, IA.—The manager of the Farmers' Mutual Telephone Company, of Hudson, Ia., is endeavoring to organize an association of Mutual and Independent telephone lines in Des Moines and vicinity. The object is to perfect a system whereby the companies can use each other's lines on long distance talks on a toll paying basis. Such an association has recently been organized by Mr. Hollis among the Independent and Mutual companies in Black Hawk, Tama, Delaware, Buchanan, Butler, Fayette, Clayton, Chickasaw, Grundy and Floyd counties.

FAIRFIELD, ILL.—The Wayne County Telephone Company, which operates exchanges in Fairfield, Ill., and at Albion, in Edwards County, has sold the latter interests to Arch Bassett, formerly of Salt Lake City.

GRAMMER, IND.—The Grammer Telephone Company has purchased the exchange building and equipment of the Burnside Telephone Company, and the exchange of the latter company will be moved to Grammer.

WINONA, MINN.—The Robinson Telephone Line, which is a line about five miles in length and which serves a number of farmers near Money Creek, has been acquired by the Winona Telephone Company, of Winona, Minn.

ELECTIONS.

HILLSBORO, ILL.—The following officers have been elected by the People's Mutual Telephone Company: George D. Taylor, of Litchfield, president; C. H. Poland, of Fillmore, vice president; Robert P. Barnard, of Nokomis, secretary; A. K. Vandever, of Irving, treasurer.

LAFAYETTE, IND.—The Lafayette Telephone Company has elected the following officers: President, William Folckemer; vice president, William Horn; secretary, O. P. Friberg; treasurer, William S. Baugh; attorney, George P. Haywood; manager, Frank O. Cuppy.

MARQUETTE, MICH.—The following directors have been elected by the Marquette County Telephone Company: J. E. Sherman, D. W. Powell, Marquette; Alexander Maitland, E. C. Anthony, J. H. Winter, Negaunee; M. M. Duncan, H. O. Young, A. B. Miner, Ishpeming, and D. T. Morgan, Republic.

PERSONAL.

ALBERT G. CHASE has been made manager of the exchange of the Northwestern Telephone Company at Faribault, Minn.

F. P. LANGMAID has been promoted to the position of manager of the Holyoke, Mass., exchange of the New England Telephone and Telegraph Company.

J. H. LYONS, formerly of the Houghton district of the Michigan State Telephone Company, has been promoted to the position of traffic manager, with headquarters at Detroit.

D. J. MATHEWS has been elected secretary of the Lake Shore Telephone Company, of Hart, Mich. He has also been made a director of the company.

New Construction in the Field

MOBILE, ALA.—The Home Telephone Company, which is completing the installation of its new system at Mobile, upon which over $300,000 has been spent, expects to at once make long distance connections with towns along the east shore of Mobile Bay, towns along the Bay Minette and Fort Morgan Railroad, and later to New Orleans.

ASSUMPTION, ILL.—The lines of the Assumption Telephone Company, of Assumption, Ill., are being extended in that city.

BETHALTO, ILL.—The Star Telephone Company expects soon to establish connections btween Upper Alton and Bethalto.

COLUMBIA CITY, IND.—The Whitley County Telephone Company is to install new switchboards at two of its exchanges, namely Etna and Larwill. The boards will have a capacity of 250 subscribers each, and will greatly improve the systems at these points. Other improvements are to be made by the company at both cities.

WATERLOO, IA.—Long distance lines from Waterloo, Ia., to Webster City, Sioux City, Sioux Falls, Council Bluffs, and eastward, have been completed by the Corn Belt Telephone Company, and the company, in connection with other Independent companies, is now in a position to compete favorably with the Bell company, which formerly held a monopoly in that section of the country.

JENA, LA.—A telephone exchange is to be established at Jena, forty miles east of Winfield, La., on the Louisiana and Arkansas Railroad. O. E. White is at the head of the proposition.

BERNARDSTON, MASS.—A new switchboard has recently been installed by the Bernardston and Gill Telephone Company at Bernardston, and other improvements are contemplated.

CHARLEMONT, MASS.—The Deerfield Valley Telephone Company is constructing a new line to Charlemont, which will give Charlemont subscribers direct connection with the central office at Shelburne Falls.

ADRIAN, MICH.—Many improvements are to be made by the New Long Distance Telephone Company, of Indianapolis, in its plant at Adrian.

MARQUETTE, MICH.—Among the improvements planned by the Marquette County Telephone Company is the installation of new and up-to-date equipment wherever it is necessary, both in the central station and outside. New poles are to be raised and new wires added, and in the cities the wires on the principal streets will be placed in cables.

PORT HURON, MICH.—Over eleven hundred feet of cable will be used in the new construction work contemplated by the Port Huron Telephone Company.

MANKATO, MINN.—The Mankato Telephone Company, of Mankato, Minn., has under consideration many improvements and extensions in its system, including the purchase of large cables for new lines into Ogle, Davis, West Mankato and North Mankato, the present lines being insufficient to take care of the company's business at these points. Improvements will also be made on the farmers' lines running into Garden City and the Spring Island District.

MINNEAPOLIS, MINN.—Owing to the rapid increase in residence telephones on the Tri-State Telephone Company's system the exchange has been enlarged to accommodate a switchboard large enough to give service to 12,000 subscribers.

ST. JOHNSVILLE, N. Y.—Lines are to be constructed by the Interstate Telephone Company from St. Johnsville to Crown Creek and Oppenheim. The line to Hornellsville has already been completed.

BARBERTON, O.—Upon the completion of new exchange at Akron by the People's Telephone Company, many improvements will be made in its local system at Barberton. New toll and transfer boards will be installed, and the service made strictly up-to-date. It is estimated that about $2,000 will be spent on the work.

GLENDALE, O.—The Glendale Telephone Company is constructing an exchange at Glendale, which it expects to occupy very soon. A new 500-line switchboard will be installed in the new quarters.

HAMILTON, O.—The Home Telephone Company is planning many improvements in its system at Hamilton.

MANCHESTER, O.—An Independent telephone system is being installed in Manchester by Elisha Humphreys, of Omega, who is president of both the Pike and Adams County Independent Telephone Companies. This will enable him to establish connections with Maysville. The Adams County company operates over 150 miles of toll lines in Adams County, and has built 40 miles additional in the adjoining county of Brown.

MEQUON, WIS.—The lines of the Mequon Telephone Company are being extended in Mequon.

UNDERGROUND.

EVANSVILLE, IND.—The Cumberland Telephone Company is at work on its underground system at Evansville, Ind.

BUTTE, MONT.—It is the intention of the Independent Telephone Company to install 40,000 feet of underground cable at Butte, Mont.

GLENS FALLS, N. Y.—The Commercial Union Telephone Company is to place some of its wires underground in Glens Falls.

WATERFORD, N. Y.—The Hudson River Telephone Company is placing some of its wires underground in Waterford.

COLUMBIA, S. C.—It is expected that all telephone wires will soon be placed underground in the business district of Columbia.

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Some Features of Interior Block Distribution on Manhattan Island*

By O. R. Barnes.

REPLACEMENT of the junction box method by a still more advanced system of distribution is now foreseen by many as the result of the same forces which some time ago forced the telephone company to give up the use of roof fixtures. Bearing in mind the actions which have in the past been brought by property owners it is by no far-fetched course of reasoning that many have been led to predict that in the future some person may start a movement which will likewise cause the abandonment of fences and walls as a means of support for wires and cables. Even now such a movement is occasionally led by some dissatisfied one, but his efforts have been met by such prompt and effective action on the part of the telephone company as to do away with the necessity for any extensive changes in its system, and in fact have usually resulted in quieting the disturbance even before the wires which were the cause of the alleged dissatisfaction have been removed. The method adopted is as simple as could be devised. As soon as an objector to the presence of wires and cables on the fences commences an agitation, and attempts to interest his neighbors and secure their co-operation the telephone service is cut off for that block. The telephone company can give a good reason, based upon the obvious need of cutting the wires while changes are being made. To the subscribers, however, who are in reality not seriously, if at all, inconvenienced by the presence of the company's property in a location where it does no damage, the loss of the service is a serious injury. The sentiment against the telephone company is soon turned against the agitator, and the united efforts of all his neighbors may be usually relied upon to bring him quickly into line. The efforts to bring about the removal of the fixtures which are supposed to be so offensive are speedily dropped, and the fences and walls continue to carry their load, and the restoration of service brings satisfaction to all concerned. Concessions on the part of the original disturber make him appear, after all, in a small degree a public benefactor, willing to sacrifice his rights for the benefit of his neighbors, and the company thus puts off the expense of reconstruction.

Typical Conditions in Enclosed Block in New York City. The Fences are Used by the Telephone Company to Support Not Only Twisted Paired Wire, but Cable of Various Sizes.

This method of overcoming opposition, however, is not always productive of the desired results, even in restricted localities. The company has occasionally met with people of a class which does not believe in giving up its whims, even to accommodate the neighbors. In a certain section of New York City there are to be found many people who insist that the telephone company shall bring its wires into their houses in the same manner as is adopted by the gas and electric light companies in making house connections. By the concentrated efforts of a group dwelling in the houses surrounding one whole block the telephone company has already been obliged to carry its wires to the premises without recourse to the scheme of open distribution on fences. Direct connections have been made to every house bordering this block.

When the sentiment which has brought about the abandonment of roof fixtures shall have spread among residents to a sufficient extent to bring about a general, united action against the present mode of distribution the provision of a direct connection to every house on the Island seems to be the only course open to the telephone company. Nearly every telephone engineer's conception of an ideal telephone plant is one that contains no exposed cable, terminal devices, or aerial wires of any sort whatever. When the facts which have been stated are carefully considered, they alone

*Continued from the issue of Aug. 25th.

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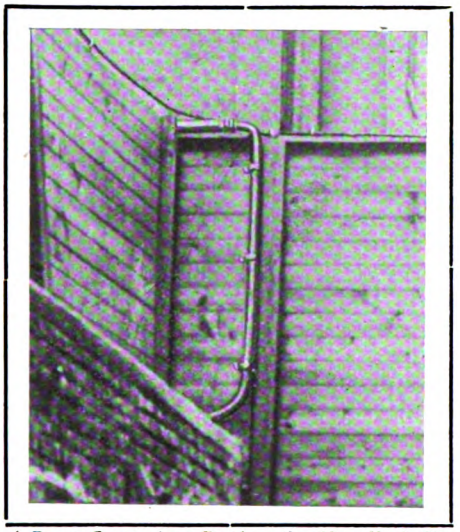
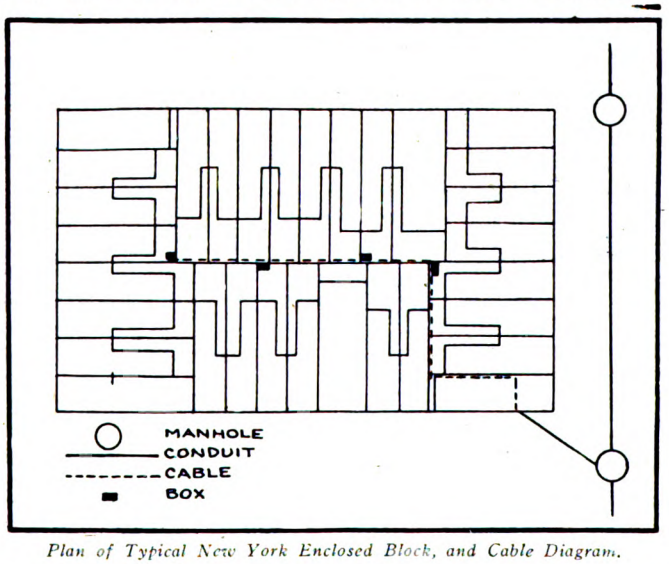
will furnish a sufficient explanation for the feeling in favor of the elimination of all forms of distribution which are not in the strictest and truest sense underground. This would mean that no wire would come into the open air at any point between the central office and the subscriber's station. In favor of this view of the system which is proper under the conditions which prevail, as has been described, is the advisability of completely doing away with any system which breeds ill-feeling between the public and the owners of the system, in the manner which has been referred to in connection with the description of both the roof fixture and the junction box methods. Although it is generally proclaimed that the ideal all-underground standard is practically unattainable the recognition of the inferiority of other methods of distribution is strong evidence that a movement in favor of the later standard is actually making progress.

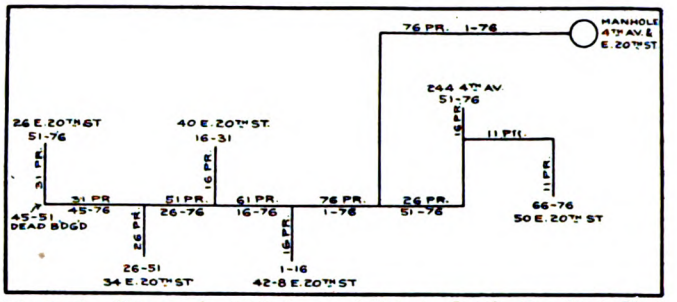


A Fence Corner in a Portion of a New York City Interior Block, Showing Cable, Which is Divided at Top to Supply Junction Box on Opposite Side of Fence.

A consideration of the probable cost of making the change to underground connections over the whole Island of Manhattan brings out some figures, however, which are very interesting from their magnitude alone. There are, roughly estimated, 90,000 buildings in this district which have telephone service. To provide direct connections to each one of these buildings would require an expenditure of not less than $4,500,000 for house connections alone, and this amount would not include the slightest allowance for main conduit and cable. With a limited diminution of the amount of outside wire in favor of the underground system there would follow a change in figures which is decidedly interesting. For instance, let it be assumed that only those buildings where it is expected that there will be ten telephones or more will be provided with direct connections, provision being made for distributing to other points in the immediate vicinity of these buildings by means of local cable or wires to the instruments. There are now on the Island not far from 6,000 buildings which have more than ten telephones each. At an estimated cost of $100 per connection for service laterals and cable it would appear that for a little more than $600,000, in addition to the cost of main conduit and cable, direct underground service could be given to between 60,000 and 200,000 telephones, and thus handle the greater part of the business. To be compared with this is a figure of $400,000 for outside wires, counting 200,000 individual subscribers' loops at $2.00 each—a sum which is indeed large, but is immensely increased by the added costs of maintenance and depreciation which bear so severely on a plant of this character.



Plan of Typical New York Enclosed Block, and Cable Diagram.



Distribution Diagram for Main Run and Taps to Supply New York Block.

DENVER ALDERMEN VOTE TO SUBMIT FRANCHISE FOR INDEPENDENT COMPANY TO POPULAR VOTE.

THE vote of the Aldermen of Denver, Colorado, submitting to the people the question of granting a franchise for an Independent telephone system was purely a formal matter. The bill was passed without opposition, as the charter provides that when an ordinance of this nature is submitted with signatures amounting to 10 per cent. of the vote at the last general election, it must be submitted to the people for their adoption or rejection. The city clerk reported to the board that the number of signatures was sufficient, and representatives of the new company state that they had obtained over 39,000 signatures to their petition. There is little doubt that many more could have been secured had it been worth while, but the sole object was to obtain enough to insure the passage of the ordinance.

The matter of the franchise is now in the hands of the people, to be decided at the next election. Although the Bell company is very strong in Denver at the present time, the rapid development of Independent service in adjoining states is bound to have a strong influence upon the people of Colorado, and to operate in connection with whatever dissatisfaction has been experienced with the present service and high rates to create a rather strong feeling in favor of competition.

Low Cable Box, Serving as Distributing Point for Main Leads from Conduits —and Other Purposes.

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How to Provide for Reconstruction and Create a Market for Securities*

By E. D. Schade.

WE all have heard the telephone exchange manager complain that he does not have sufficient capital at his command to properly develop the business in the territory being operated. There are very few communities in the United States that do not have unlimited available capital to develop the telephone needs of each district, if properly managed.

The history of a large percentage of the incorporated companies in this country reveals the fact that they fell victims to a common error at the very start. Usually, after the parties interested in the formation of a new telephone company received the prospectus of the proposed system, they decided that a certain amount of capital would build, equip and operate the plant, which was readily subscribed for by the promoters and persons interested. After operating six months or a year, the management finds the demands for the service are exceeding their expectations, and that in order to be able to give service to those who apply, it is necessary to extend the lines and increase the facilities in many ways, all of which consumes capital.

In order to meet this demand, he uses whatever funds may be available, thereby keeping his treasury drained all the time.

Your annual statement shows that your first year's operation netted a handsome profit, and console your shareholders with the fact, that in order to meet the demands for your service, you were compelled to invest the earnings for additions and extensions, and that the book value of your stock is anywhere from ten to twenty per cent. above par, and for this reason you cannot pay a cash dividend. This report is satisfactory to all concerned, and at the end of the second year, you find the same conditions. You again make a similar report.

You now find that your shareholders are not so much enthused over their holdings, and everybody interested begins to realize that a prosperous telephone plant has a voracious appetite for money, and you all wonder when will this ever stop. You continue in this manner from year to year, and you find your treasury constantly drained. You have not created a surplus fund to provide for reconstruction, commonly known as depreciation. Eventually you declare a dividend to the amount of the earnings which you have invested for extensions, etc., but on account of not having paid any cash dividends, your stock has no market value, and your stockholders become dissatisfied and disinterested, your plant depreciates, and in many cases is in deplorable condition.

Now suppose you had pursued a different policy. At the end of the first year your statement, as in the first case, shows net earnings anywhere from ten to twenty per cent., and your original capital all invested. You set aside in a surplus or reconstruction fund, a reasonable sum to provide for renewals of your property from time to time, and pay the balance to your shareholders in cash, quarterly, dividends. You issue additional stock to provide funds for the necessary extensions, and you find your shareholders all eager to take up their proportion of the new issue. You now find that your property is earning a handsome surplus annually, out of which you add from year to year, a sufficient sum to your reconstruction fund to provide for renewals of your plant, and pay the balance to your shareholders in cash dividends. You soon find your stock commands a premium, and is much sought for by investors and business men, each one of whom makes your company stronger and more representative.

I am familiar with the operating and financial details of a property that began operating in 1895, which invested its earnings in extensions, but created no surplus or reconstruction fund. After operating five years, the company realized that the entire property had become antiquated, and they must either reconstruct the plant or go out of business. A stockholders meeting was held, and the final verdict was in favor of rebuilding the entire property, and operating under the "pay cash dividends and create a reconstruction fund" plan. The first plant showed a net loss in five years of about $52,000. The second plant, after operating five years, is in a much better physical condition than when constructed, has been paying handsome cash dividends, has a permanent reconstruction fund of $50,000, and the stock, par value $50, is in demand at $130.

You can readily understand why this property has not depreciated. The book value of this stock is never less than 100 per cent. of the cost of the property, and the market value as much over 100 per cent. as the public will pay premium for the stock.

*Abstract from address delivered at the Convention of the Pennsylvania State Independent Telephone Association.

PROPERTIES OF WOOD OF EUCALYPTS GIVEN OUT BY FOREST SERVICE.

A BULLETIN recently issued by the Forest Service gives a summary of the results obtained in a study of the mechanical and physical properties of the common eucalypts, which was recently conducted in co-operation with the State of California. The tests made at the State University at Berkeley were to determine whether eucalyptus can be substituted for some of the hardwoods that are becoming difficult to obtain.

The bulletin states that the wood of eucalypts has not been extensively used by manufacturers in the United States, because the supply has not been sufficient to establish a market. Blue gum, the most common species in California, has, however, competed with black locust for insulator pins, has given satisfactory service in chisel and hammer handles, and has been used locally for wagon tongues, axles, shafts, spokes, hubs and felloes. It is hard, strong and tough.

Species. Common Name.	Botanical Name.	Diameter Inches.	Height Feet.
Blue gum.	Eucalyptus globulus.	30	101
Sugar gum.	Eucalyptus corynocalyx.	15	73
Karri.	Eucalyptus diversicolor.	16	72
Manna gum.	Eucalyptus viminalis.	12	60
Red gum.	Eucalyptus nostrata.	9	47
Leather-jacket.	Eucalyptus punctata.	10	43
Red mahogany.	Eucalyptus resinifera.	8	38

Table showing height and diameter of trees from which were taken test pieces which gave results indicated in second table. All trees were about fifteen years old.

An important point in considering the value of commercial plantations of eucalypts is brought out in the second table, which shows that the fastest growing are also strongest.

Species.	Age in years.	Bending. Number of tests.	Bending. Modulus of rupture, lbs. per square inch.	Compression parallel to grain. Number of tests.	Compression parallel to grain. Crushing strength, lbs. per square inch.
Sugar gum	15	5	25,344	11	11,290
Blue gum	30	12	23,265	15	12,310
Leath r-jacket	15	3	19,267	10	10,008
Karri	15	8	18,386	17	8,795
Blue gum	15	28	16,900	34	8,190
Red mahogany	15	4	14,550	2	7,920
Red gum	15	9	14,380	6	7,723
Manna gum	15	12	13,093	20	7,309

Table giving summary of results obtained in tests of wood from several different species of eucalyptus.

Comparison with Forest Service reports on hickory shows that

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30-year-old blue gum is stronger than XXX hickory, and that 15-year-old sugar gum is nearly as strong as black hickory and 91 per cent. as strong as second-growth hickory.

The wood of very young and sappy trees is apt to warp, but that from more mature growth can be easily handled to prevent warping. Early seasoning should proceed slowly. Open piling is desirable; the stacks should be high to secure weight, and should be covered.

Several of the eucalypts grow rapidly in California, and under forest conditions, form straight, tall poles free from branches.

Operating Methods*

By A. J. Ulrich, Traffic Manager, Keystone Telephone Co. of Philadelphia.

THE service inspection bureau is in charge of a chief service inspector whose duties are to arrange schedules for the day, evening and Sunday tests in the various districts, and arrange a subscribers' list in these districts in order to aid the service inspectors when making tests. These service tests are noted on little blanks in pad form by the service inspectors while making the test. When the tests are completed and inspectors return to the office they fill in a regular form provided for this purpose, showing the time and what subscribers' telephones the tests were made from, time it took the operator to answer, both on originating calls and re-calls, and note in the "remarks" column any irregularity, such as wrong phrases being used, or failing to repeat numbers, poor supervision, and the like. In addition to noting this, they work out a per cent. of the number of calls answered in four seconds or better, also those that are answered in eight seconds or better.

These tests are then entered on the monthly report record and turned over to the traffic manager, who marks his criticism of the test, if there is any, on the report, which is then sent out to the district manager in whose territory the test was made. Results of these tests are then gone over by the district manager with the chief operators, supervisors and operators concerned, and they can tell from the report just what operators gave the long answers, for at the time the test is made, if a call is not answered until 10 seconds have elapsed, the inspector ascertains from the chief operator the number of the operator who handled this particular call. This number is noted on the report, and serves as a means of identification when these reports are sent to the district manager for his explanation of any long answers or irregularities in the handling of the work in his district.

The traffic department handles all complaints from the subscribers, relative to service. A record is kept of whether the complaint came in by letter or telephone. When the general manager's department receives a letter of complaint there is a series number stamped on the letter, and it is charged up to the traffic department, which acknowledges having received it by signing a slip having a number corresponding to that on letter of complaint. This complaint is then gone into, and if it is of such a nature that the trouble complained of might be due to maintenance, a slip is made out and sent to the maintenance department requesting it to have the line and instrument inspected. The original letter is sent to the district manager, who follows up the complaint and ascertains from the maintenance department whether any trouble was found, and if so, notes it on his

KEYSTONE TELEPHONE CO. OF PHILA.

SUPERVISION TEST.

Opr. _____ Ex. _____

Opr. No. _____

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1 Asked for No. more than once--fault of opr.													
2 Asked for No. more than once--fault of sub.													
3 Did not use rising inflection													
4 Did not repeat													
5 Did not repeat prefix													
6 Did not repeat letter													
7 Repeated part of number only													
8 Did not repeat number in units													
9 Repeated wrong No.--fault of opr.													
10 Repeated wrong No.--fault of sub.													
11 Did not wait for O.K. from sub.													
12 Repeated wrong No.--sub. failed to correct													
13 Connected with wrong No.--fault of "A" opr.													
14 Connected with wrong No.--fault of "B" opr.													
15 Took up wrong local													
16 Placed call over wrong call circuit													
17 Failed to make proper "busy" test													
18 Broke in on busy line, answering wrong re-call													
19 Did not take disconnects down promptly													
20 Premature disconnect--answering jack													
21 Premature disconnect													
22 Opr. answered call by saying "Hello"													
23 Opr. answered re-call by saying "Hello"													
24 Opr. answered re-call by saying "Number?"													
25 Opr.ans.re-call by saying "I'm trying to get them													
26 Poor supervision (for you"													
27 Impudence													
28 Listening on connection													
29 Talking to subscriber													
30 Talking to circuit operator													
31 Slow answer													
32 Slow re-call													
33 Talking to next operator													
34 Repeated number too rapidly													
35 Inattention													
36 Deportment-(a) Humming, (b) Singing, (c) looking around													

Form Used for Recording Data Secured on Monthly Supervision Tests of Operators. Tests of the Work of Every Operator are Made by the Chief Operator or a Supervisor Designated by the District Manager. Size of Form, 8½ x 12 Inches.

*Continued from the issue of October 13th.

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report, calls up the subscriber and explains the cause of trouble. If the trouble is found to have been caused by poor operating this is also noted, and the matter taken up with the operator handling this subscriber's calls, and the subscriber kept in touch with for a few days to see if there is any improvement in his service. At the time of receiving a complaint a record is also entered on a form which shows from what subscriber this complaint came, the nature of the complaint, and also to whom the complaint was referred. When these reports come back from the district manager, if he is of the opinion that it would be advisable to have a special service inspector see the subscriber in person he so specifies on his report. This is generally found

Form 395-5-06-35m.

SERVICE TEST.

DATE, 190

TIME M

FROM NO.

CALLED NO.

OPERATOR ANSWERED, SEC.

RECALL.

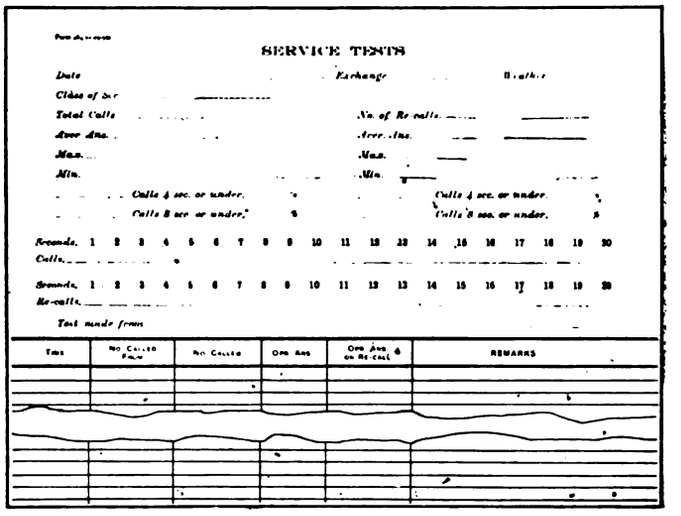
CALLED NO.

OPERATOR ANSWERED, SEC.

SIGNED,

Enlarged Reproduction of Blank Used by Service Inspectors for Recording Results of Tests. Size 2 3-16 x 3½ Inches.

to be the case on two party trouble, and on subscribers' lines where there are one or more extensions on the line. The special service inspector then makes it a point to explain the cause of the trouble to subscriber. For example, on two party complaints he is likely to have to show how trouble may be due to some one trying to use the line when the other party is using it, or how a "busy" report could be given on the "D" party's telephone while "A" was using it, without "D" having used the telephone for several hours, and the like. The special service inspector then turns in his report, which is entered on the monthly sheet, show-



Form 8½ x 10⅞ Inches in Size, with 37 Horizontal Rulings in Lower Portion. Used for Summary of Service Tests.

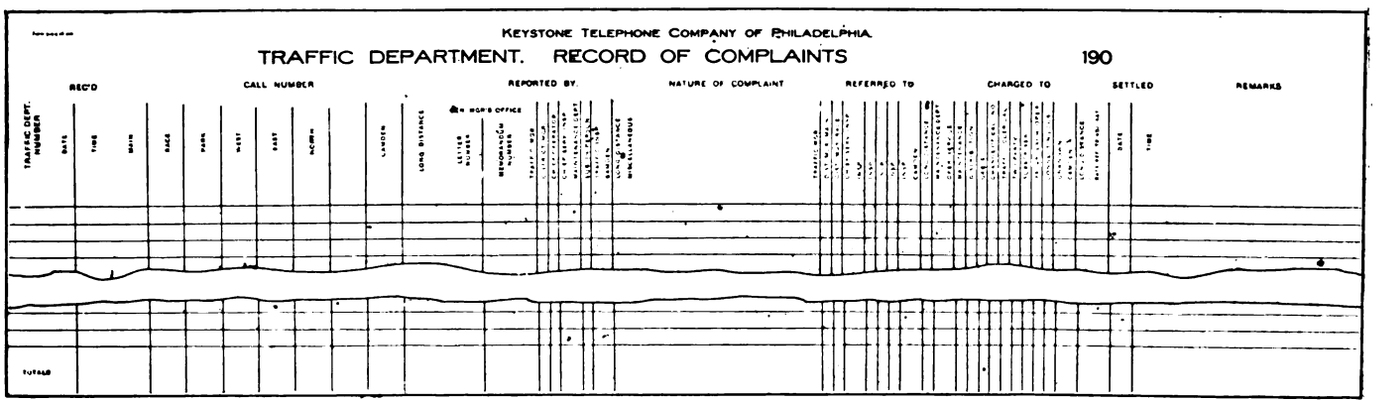
ing the handling of the complaint from the time it was received until it was cleared to the satisfaction of the subscriber. All service complaints on which investigations have been made and closed are then sent to the record department to be filed in the subscribers' individual folders, and in this way a complete record is kept from the time the subscriber's telephone is installed.

In such cases of complaints as involve matters which should be taken up by the adjustment agents this is noted, the date on which it was referred to the adjustment department is recorded, and as far as the traffic department is concerned the case is closed. By this method the department can, at the end of the month, give a history of every complaint, the number of complaints, whether received by letter or telephone, to what department they were referred, and what department was at fault, whether operating, maintenance, distribution, cable, etc.

A monthly report is made up showing the result of the service tests, the average being given on day, evening and Sunday tests according to exchanges, and ranked according to merit, both as to originating calls and recalls. This enables the traffic department to see whether the answering of calls in any particular exchange is falling below the average, and if it is found that this is the case the matter is taken up with the district manager concerned.

A monthly report of the number of complaints and the results of the service testing is made up from these records and forwarded to the general manager.

The reporting of trouble by the various exchanges is so arranged that in addition to making out a regular maintenance



Form Used by Keystone Telephone Company for Recording Course Taken by Complaints. Size 23⅛ x 18⅛ Inches.

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trouble slip, it is also noted on a chief operator's trouble report, and any cases that are still out of order five hours after having been reported, are specially noted. A report is telephoned to the traffic manager's office every morning at 8:30, giving the number of employees absent, amount of trouble reported and not yet O. K., according to lines, switchboard and trunks per exchange; also the number of cases that are known as "left over trouble" from the day previous. This report places the traffic manager in a position to ascertain the amount of trouble in any one exchange, and if above normal, arrangements can then be made so that the service can be handled to the best advantage until the trouble is cleared.

INDEPENDENT FRANCHISE FOR OMAHA WILL BE SUBMITTED TO POPULAR VOTE.

THE city council of Omaha, Neb., has passed a measure which will give the people of Omaha an opportunity to determine by vote whether an Independent system shall be constructed in that city.

The measure provides for submission to the voters of Omaha at the coming election the question of granting a franchise to the Heim-Parmelee-Pollack syndicate, on terms that will mean a reduction of fully one-third in telephone rates, give free connection with South Omaha, give full connection with the thousands of Independent telephones in the surrounding territory, and pay into the city treasury a percentage of the gross receipts of the company.

The Bell interests fought the measure at every turn, and it was only after a bitter contest that it was passed.

The provisions of the new Independent telephone franchise are briefly summarized as follows:

The grantees are Joseph J. Heim, of Kansas City; T. E. Parmelee and T. H. Pollock, of Plattsmouth.

The life of the franchise is twenty-five years.

They are given the right to erect and maintain conduits, wires and other necessary appliances, the city reserving the right to at any time impose any reasonable regulation that may be deemed proper for the safety and protection of the citizens and their property.

The latest and most approved apparatus and equipment must be installed.

The underground conduit system will include not only all territory now covered by the Bell conduits, but will extend south to Leavenworth, the city reserving the right to order its further extension at any time.

The city is given the use of one conduit duct and the top cross arm on the pole lines for the use of its fire and police wires.

The company must deposit with the city $1,000 before opening up any street excavation, and this money is to be used by the city in restoring the street to good condition, if the company fails to do so within thirty days. The amount of $1000 must at all times be maintained on deposit with the city for this purpose.

The principal office of the company must be maintained in Omaha, and a majority of the directors of the company must at all times be bona fide residents of this city.

The books and records of the company must be open to the inspection of the taxing authorities for the purpose of determining the taxable value of the property.

On the first day of January of each year the company must pay into the city treasury 2 per cent. of its gross earnings of the year just closed.

The company must furnish the city twelve free telephones.

The company is barred from selling out to any other telephone company doing business in this city or to any corporation interested in any other telephone system in this city.

A cash forfeit of $25,000 is required, to be forfeited with the franchise if an up-to-date plant for 10,000 subscribers is not completed within two years.

Free service is to be given between Omaha and South Omaha subscribers.

The company is required to make connections at the city limits with any Independent telephone company that may come there and demand such connection, and shall furnish it as cheaply as charged by other Independent systems for like services.

The company cannot make any charge whatever for telephone service until it has 3,000 telephones in operation. Until there are 8,000 telephones the charge for individual line business telephones shall not be more than $4.50 a month, and never more than $5 a month. Individual line residence telephones may not exceed $2.50 a month up to 8,000, and never above $3. Two party line business telephones shall never exceed $3 a month, and two party residence telephones shall never exceed $2 a month. Four party residence telephones shall never exceed $1.50 a month, and eight party residence telephones shall never exceed $1 a month.

Measured service telephones are to be furnished so that a residence telephone may be secured at 50 cents a month.

As the mayor has signed the bill, as he was expected to do, the final obstacle to the submission of the franchise to the people has been removed.

UNIFORM METHOD OF QUOTING TELEPHONE NUMBERS ADOPTED AT MACON, MISSOURI.

A UNIFORM system of quoting telephone numbers has been adopted by the Macon Telephone Company, of Macon, Mo. Typical numbers with the approved method of quoting them are as follows: 11 11 double-one, 18 1-8 one eight, 20 2-0 two-0, 22 22 double-two, 56 5-6 five-six, 100 100 one-double-0, 114 11-4 double-one-four, 202 2-0-2 two-0-two, 347 3-4-7 three-four-seven, 355 3-55 three-double-five, 458 4-5-8 four-five-eight, and the same on country lines, as: 577Q Q5-77 Q five-double-seven, 558L L55-8 L double-five-eight, 1000M M10-00 ten-double 0, 1146 11-46 double-one-four-six, 1177M M11-77 M double one double seven, 1212 12-12 double twelve.

These instructions covering the method of pronouncing the numbers have been issued by H. L. Gary, secretary of the company, to all employees and published in the local papers. It is hoped that the plan suggested will be quickly adopted by the public, resulting in a saving of time, which will be appreciated by those anxious for rapid service.

EXACT FIGURES SHOWING IOWA'S REMARKABLE INDEPENDENT TELEPHONE DEVELOPMENT ISSUED BY STATE EXECUTIVE COUNCIL.

IOWA still leads the world in the number of Independent rural telephones. The report of the Executive Council of the State which has been given out this week indicates a remarkable development in this branch of the telephone industry. At the time the figures for the United States Census Report Bulletin were compiled, showing the conditions in 1902, Iowa was found to have reported more rural telephones than any other State, and had 21.9 per cent. of all such telephones in the United States. The figures obtained to serve as a basis for taxation show that the Independent companies control about five times as many of these telephones as do their rivals associated with the Bell organization. The number of instruments on lines of the two classes is as follows:

Bell company and Allied companies not Independent.	Exchange & rural Instruments.	Instruments on Toll lines.	
Iowa Telephone Company.....	33,489	873	
Nebraska Telephone Company....	3,044	16	
Western Electric Company.....	1,254	170	
	37,777	1,059	
Total			38,836
Independent Telephone Companies	183,586	903	
Total			184,489

These figures show that not only have the Independent companies maintained their lead over their rivals, but also have forged ahead so rapidly since a similar report was issued last year as to make the State stand forth prominently in comparison with all others when the development is considered on the basis of the proportion of rural telephone users to the entire rural population.

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QUERIES

TRANSPOSITION.—(784.)

We are constructing a trunk line 14 miles in length and expect to transpose it as may be required, but on the same cross-arms we will run two other lines, one 6 miles and one 4 miles. They will be party lines, with 4 and 10 subscribers, and all lines full metallic. Now, will it be necessary to transpose short line same as the long line, or can we run the short lines without transposing and not injure the service?

The enclosed diagram may convey an idea of the construction and relative arrangement of the lines better than a letter.

You will notice we will have some unused pins on the 6 and 8 pin cross arms. I doubt that we will ever use them. We have no electric light wires to contend with, neither any trolley lines. W. S. C.

IN general it is found necessary to transpose telephone circuits if they are exposed to one another or to any foreign source of disturbance throughout a distance of 4 miles or more. If the foreign source is particularly strong or the circuits are in very close proximity to each other shorter lengths must be transposed.

For the purposes of transposition a line is first divided into sections such that the number of circuits and their relative positions are constant throughout each section. Each section is then transposed as if it were an individual pole line, both as regards its own circuits and foreign circuits.

Considering your particular case, it is evident that the most important circuit is the trunk "A" (see Fig. 784). This falls naturally into two sections, the one from the exchange two and one-half miles to the first junction pole, and the other from this pole to the end of the subscribers' line six and one-half miles out. In this latter section we can disregard the effect of loop D, which extends only two miles.

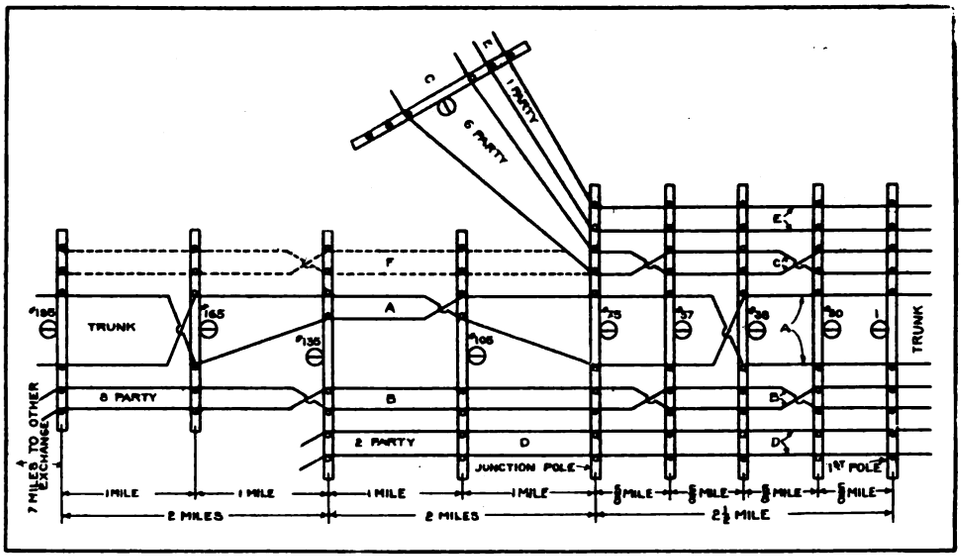

Fig. 784.

In the first section all circuits should be placed as shown, on the upper cross arm. It is evident, however, that circuits D and E may be run on the lower arm if their relations to A are kept symmetrical. For all practical purposes it will probably not be found necessary to take any extra precautions as to the location of any circuits in the first section, except A, B and C, unless it is desired to place a circuit on the lower arm directly below A on the pole pins. This circuit should be transposed like B and C.

An additional circuit, which may run for three miles or more in the second section, should be placed upon the unoccupied pins F and transposed at the same poles as B.

This method of transposition is based on the arrangement employed for long distance lines and will prove entirely adequate. It is not necessary to transpose circuits C and E outside of the first section.

BUZZER FOR TESTING CONDENSERS.—(785.)

In your issue of Sept. 29, 1906, Page 203, Figure 3, illustrating article on Condenser Testing by Mr. C. D. Enochs, you show a "low wound" buzzer in the primary circuit of the induction coil with battery, for one of the tests. Can you give me the resistance of coils of this buzzer, or specifications for coils for buzzer that will work steadily under conditions shown in diagram?

I have tried all kinds of buzzers, vibrating bells, etc., with many different strengths of battery, but never got satisfactory results, as buzzer or bell would invariably stick, and at times they were very difficult to adjust so that I could get a rough test. I have abandoned the use of buzzers and made use of a circuit breaker such as is used on medical coils, with fairly good results, but I have always fancied that if a satisfactory buzzer could be procured, that would be the better arrangement. W. M. L.

THE term "an ordinary low wound buzzer," as indicated in Figure 3, issue September 29, Page 203, was intended to specify an ordinary buzzer, such as is used in coin boxes and inter-communicating telephones. A buzzer of the Eco type, or any other of this class, wound approximately to 4 ohms, will be found to give good satisfaction. If the buzzer sticks as stated, it can only be from ordinary buzzer adjustment, as there is nothing in the circuit to cause any different action on the part of the buzzer than will be found in ordinary practice. A higher wound buzzer can be used successfully, and the circuit breaker mentioned will probably be first class if wound to not more than 6 or 8 ohms. All that is needed is a buzzer to break the current in the primary of the induction coil, so that a fairly loud tone is produced in the receiver by the inductive action of the coil.

SUPERVISION.—(786.)

We are about to install a new common battery switchboard and are having a great deal of discussion about the proper method of supervising the work of operators. Some say it should be in charge of the chief operator, and handled from her desk, while others think we ought to have a supervisor. Can you advise us? B. L.

IN an exchange where there are less than twelve or fifteen operators the chief operator is not usually so heavily burdened with other duties as to make it impossible for her to exercise a very efficient supervision over the work of individual operators at the board. She is able to watch the conditions from her desk, and whenever there is a rush can leave her seat and go to the switchboard to give any instructions or help which may be needed.

Where there are over fifteen operators, however, the chief operator usually has enough to do in handling routine work, complaints, service tests, etc., and cannot look after the details of operating from hour to hour closely enough to make sure of rapid clean-cut work. In such a case it is well to have one or more supervisors, whose duty is to maintain a constant watch over the work of the girls at the board, and render all possible assistance. This assistance usually takes the form of aid in team work, calling attention to signals which have burned too long unanswered, help in disconnection, etc. A supervisor can make it possible for an operating force to handle many more calls per position than it would unaided by building up an efficient system of co-operation in answering signals, and thus earning her salary.

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THE EDITOR'S PAGE

KEEPING LINE RECORDS.

RECORDING all changes in line connections both in the central office and in cable boxes is known to be the standard practice of all well managed telephone companies. It is a safe assumption, however, that in a very large percentage of the smaller exchanges throughout the country these records have been so neglected that they are very far from being up to date, and the information they contain is so inaccurate as to be more hindrance than help when referred to in an emergency.

The object of keeping such records is, of course, to save time. If there were no records kept at all the state of utter confusion which would be experienced every morning when trouble in calling a number of subscribers was shown to exist can well be imagined. Before it could even be shown whether the trouble was in the office or somewhere out on the line a laborious testing and tracing process would have to be gone through and fault would be found with the service not only by the people on the lines in trouble, but by all the subscribers, who would be warned of the company's difficulties by the efforts being made by those in the central office to locate the terminals of the lines actually affected. The constant repetition of such an offense would soon give the company a very bad reputation with its patrons. This is very generally recognized, and yet the errors to which we refer are actually committed day after day in numberless places owing to the fact that records which are supposed to prevent this thing are one or two weeks or more behind the work of installation, or are not properly corrected when changes are made in existing lines. The only way in which such records can be made effective is by keeping them absolutely correct, and if this is done the company may count on their usefulness.

THE TEMPORARY WORK NUISANCE.

ANNOYANCE for his superior officers and expense to the company which hires him can be piled up by a man addicted to the habit of "getting things going quickly" in a way that in the aggregate totals up to an amount which is nothing short of astonishing, if his methods show a leaning to slipshod workmanship under the pretense that it is "temporary."

A trouble-man really requires considerable strength of character, and some pretty good common sense and training to enable him to appreciate how easy it is to acquire the habit of "doing things rather more or less," and how seriously its possession impairs his efficiency, reducing the value of his services to the company, and hindering his advancement. When he leaves a station in anything less than perfect shape he usually believes that he has been forced into the course he has taken, and is able to give what at first thought might pass for very good reasons accounting for his action.

In the first place, if a man is given a list of two or three stations which are out of order and need his attention, he realizes that the people at the foot of the list are dependent upon him for their service. If he does not get to them quickly he knows from experience that his reception will not be likely to be a good-humored one. He will hear unpleasant things about the company with which he is associated, instead of the comments on its promptness which would be so much more agreeable. Sometimes it is even worse than this—he gets hard words from home, too. The subscriber may become exasperated at the unlooked for delay, and, feeling an urgent need to use a crippled instrument, get in touch with the central office and speak his mind with a vigor which puts the wire chief in the proper frame of mind for passing his trouble along to the man who is thought to have brought on the attack through his slowness in getting about. A few experiences of this sort will inspire in the best of workmen a very strong inclination to cut out any frills in his work at the first stations visited, in an effort to make his rounds as quickly as possible.

Another cause of temporary work, for which a far less satisfactory reason can be assigned, is the failure of the workman to have the necessary tools or material to make the repairs which are required. Of course a trouble-man may protest with considerable justice against being compelled to constantly load himself with a miscellaneous outfit of wire, heavy tools and dry batteries, on the remote chance that some day they will be needed on a job. If the installation force does its work properly there is no need for a man to follow along with a complete outfit for doing the work over again. Between this point and the handy pocket kit consisting of a pair of lineman's side cutters, a two-inch length of resin core solder, and the stub of a match, there always lies a medium that will cover most of the cases that come up in the course of a week's work, and give a man everything that is needed for fixing things up in good shape. If the united experience of the manager and his assistants is not sufficient to determine of what such an outfit consists they would better look quickly to outside sources for advice, and if the manager cannot see that his men carry the right outfit, once it has been determined, there is something the matter with his ability as an executive officer.

Unfortunately it is a matter of common observation to those who see many telephone exchanges that this is one of the many small things in which a laxity of methods prevails, and it is therefore interesting and important for telephone men to trace its effects and learn the necessity for avoiding them, because they are bad.

The particular forms in which this so-called temporary work shows up on a careful inspection are too numerous for description, and so well known that there is not the slightest need to attempt to assign them names and give an enumeration. Of course they do not include such results of downright carelessness as unsoldered connections and loose binding posts. Those things denote an utter absence of work. Temporary work, however, usually results in removing the trouble without removing its cause, as in cases where wires or instruments are so located as to be exposed to accidental damage, and the damage is repaired without changing the location of the injured circuits or affording them any additional protection.

When the matter is considered in its final form it is discovered that in a very large proportion of the instances where work is left in poor shape for any of the reasons in the class referred to, with the intention of making a thorough job at some future date, the time for completion does not come until after further trouble has been experienced. This means that the subscriber does not get the service for which he pays, and that the company is paying for the accomplishment of that particular piece of work a great deal more money than it should. In these days of competition the subscriber does not long bear his burden in patience, so the whole loss comes back on the telephone company. There is little use in putting on a man's premises equipment good for twenty years if the attachments are not put up substantially also, for within much less time than that the subscriber will have thrown out the telephone. Wherever temporary work is found the manager and his men can do no better than to get together and come to an understanding on this point and have the understanding so thorough that there will be no more of the nuisances which arise from work of this class.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

EXCLUSION OF INVADING COMPANIES.

The following query comes from Kentucky:

Twenty years ago the M. County Telephone Company extended their telephone lines into our county five miles and established a pay station at the county seat and have operated a poor grounded line ever since. They have no county or town franchise, no right of way in county or town, but have been paying a small county tax to the county for six or seven years. One year ago the county put up at the court house and sold to the best and highest bidder, an exclusive franchise to build and operate a system of telephones in the county for ten years. A company of home men known and incorporated bought the franchise and have been constructing lines ever since. The new company also secured a franchise from the county seat to operate its lines and a switchboard. Now the M. County Telephone Company wants and threatens to rebuild or repair their line to the county seat and operate a toll station in the town and put in telephones if wanted. They say if they are not allowed to rebuild their old line over the pike, they will secure rights of way from private lines and enter the county seat in that way.

Now our company wants to cut them out of the county and of the county seat. Can we do it? W. S. C.

UNDER a section of the Constitution of Kentucky, the M. County Telephone Company has no right or authority to maintain its line and transact its business in the city or town, since it has not obtained the consent of the proper legislative bodies. The prohibiting section, No. 163, reads as follows:

"No telephone company shall be permitted or authorized to construct its tracks, lay its pipes, or mains, or erect its poles, posts or other apparatus, along, over, under, or across the streets, alleys or public grounds of the city or town, without the consent of the proper legislative bodies or boards of such city or town being first obtained; but when charters have been hitherto granted conferring such rights, and work in good faith had begun thereunder, the provisions of this section shall not apply."

The paying of the small county tax is probably no more than any other resident of the county pays who owns taxable property, and is not paid in return for any special privileges. It would certainly seem that your telephone company, acting under its exclusive franchise can secure the exclusion of the M. County Telephone Company from the city and town. The best way to proceed in the matter would be to get the city and town authorities to take proceedings against the telephone company; but if this could not be done, your own company might do so.

Whether the exclusive feature of your franchise is good or not depends upon the authority of the county to make a grant of that character, since an exclusive grant is not valid unless expressly authorized by the charter of the municipality. Joyce on Electric Law, 6 and 189. Even though your own franchise might not be exclusive, the other company, not having the consent of the proper authorities, could be made to move.

DUTY OF ELECTRIC LIGHT COMPANY TO TELEPHONE LINEMEN.

WHERE an electric light and power company maintains high-tension wires near the distributing pole of a telephone company, which the latter's employees are required to climb, the electric company owes such employees a legal duty to have its wires so placed and insulated as to permit them to perform their work in safety. Such was the holding of the Maryland Court of Appeals in a recent case. The electric company maintained certain wires in the town of Pikesville, Baltimore County, Maryland. Robert Ziehn was a lineman of the Maryland Telephone Company employed to test the line and answer "trouble calls" on the line. Being called to Pikesville to locate "a trouble" he found it necessary to ascend what is called "the distributing pole" with a cable box at the top. In going up he had to pass three electric wires of the electric company in close proximity to the pole. In descending, his left hand came in contact with one of the wires charged with 2,080 volts of electricity. Becoming unconscious, he fell twenty feet to the ground and was injured. He testified that the wire was swung against him either by the wind or the repair car coming down the road. The trial court directed a verdict for the defendant on the ground that plaintiff was guilty of contributory negligence. The court of appeals reversed this judgemnt, laying down the legal proposition first stated. Evidence showed that the insulation of the high-tension wire, at the time of the accident, was defective, and the court held that the case should have been submitted to the jury. In passing on evidence, the court held that evidence that the company changed the location of its wires after the accident was inadmissible, and also that evidence as to the insulation of other wires than those used by the company was properly disallowed. Ziehn v. United Electric Light & Power Co., 64 A. 61.

HEIGHT OF WIRES OVER RAILROAD TRACK.

I have been a reader of your journal for some time and have profited very much by your questions and answers in law. Now I would like the privilege of asking one that shall be answered in your next issue.

What is the height that telephone wires shall be above railroad track in Oklahoma and Indian Territory? Is there any penalty for cutting the telephone wires? L. T. H.

WE know of no law prescribing any certain height of wires over railroad tracks in Oklahoma. The general principle would apply, however, that the wires must be so high above the railroad track as not to endanger employees standing upon the top of ordinary freight cars. The railroad company has the right to pass a train of cars underneath the wires, with a brakeman or other employee standing upon the roof, and may require the wires to be so high that they will not touch the train, or man standing upon the cars. Southwestern Teleg. & Telep. Co., 27 S. W. 38. This is true of the passage of cars of ordinary height. The telephone company cannot be required to string its wires at such a height as to permit the passage of cars not of ordinary height. Gross v. Southern Chicago City Railway Co., 73 Ill. App. 217.

Cutting telephone wires amounts to malicious injury to property and would be punished with the same penalty as that offence.

TRANSFER OF APPURTENANCES INCLUDES FRANCHISE.

In buying the property of a small telephone company in this locality, I took a bill of sale of all the telephone lines, equipment and "all appurtenances." Nothing was said about the franchise of the company, although I naturally supposed that I was buying it. In fact, the purchase would be valueless without the right to do business the same as the company did. Will you please inform me whether I am safe in thinking that I now own the franchise of the telephone company to construct and maintain its poles and wires in the streets of the municipality? O. S. N.

THE transfer of the property to yourself certainly included the franchise of the company, although it was not expressly mentioned. The franchise is as much the property of the telephone company as its poles and wires are. City of Wichita v. Old Colony Trust Co., 132 Fed. 641.

TELEPHONE CONVERSATIONS AS EVIDENCE.

IN a suit by a wife for the alienation of her husband's affections, her son, a lad about eleven years, was permitted to testify to a conversation carried on over the telephone between the plaintiff and another person representing himself, or herself, to be the defendant. The witness admitted that he did not know the defendant, had never seen her, and had never heard her voice before, unless it was she who had earlier in the same day attempted to call the plaintiff up on the telephone. The court held that the testimony was inadmissible because the person speaking was not sufficiently identified. Sunham v. McMichael, 63 A. 1007.

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IN THE OPERATING FIELD

MAP OF IOWA INDEPENDENT LINES TO BE ISSUED BY THE CLEARING HOUSE.

GEORGE T. HEWES, manager of the Independent Telephone Clearing House of Iowa, has announced in a recent bulletin that at a meeting of the Traffic Committee, held at Des Moines, September 14th, it was decided to issue a map of the state of Iowa, 9½ by 12 inches, mounted on muslin, containing all the cities and towns within the State of Iowa, eliminating railroads and rivers so that the cities and towns may stand out prominently. Upon this map are to be drawn circles representing zones radiating from the several toll stations and exchanges which will enable toll operators and toll agents to readily compute the toll tariff charge from any given point to any given point within the borders of the state. These zones representing distances will be computed on the basis of five-eighths of a cent per mile. The map will also contain a schedule of the night rate which is recommended by the members of the Clearing House and others who may desire to avail themselves of the standard schedule. These maps will be furnished with circles before mentioned radiating from points which may be designated by the purchaser at a very low price.

The growth of the Clearing House has been very satisfactory, as shown by the figures given by Mr. Hewes.

The Clearing House was organized in January, and the March business was the first which passed through its hands. The increase for the month of April was 240 per cent more than the business cleared the month of March; the increase for the month of May was 316 per cent more than the business cleared the month of March; the increase for the month of June was 352 per cent more than the business cleared the month of March; and each succeeding month will show a corresponding percentage of increase. This growth is due to the many positive advantages derived from this method of handling toll business. Some of the attractive features of the plan have been stated by the manager as follows: "We reduce DEADHEAD business to a minimum. We observe over-time limit and thus reduce lost calls. We increase the NET earning capacity of your present lines without increasing your present investment. We give better satisfaction to the public. You get more money to build more lines, to handle more business, to get more money to build more lines, to handle more business to get more money, etc."*

BELL ADVANCES TURNED DOWN BY INDEPENDENTS OF NORTHERN INDIANA.

SINCE arrangements have been made to connect the Independent toll lines of Indiana with Chicago through the plant of the Home Telephone Company, of South Bend, Ind., the Bell Company has been very active in that state. Not long ago it is said that every Independent telephone user in northern Indiana received a statement that the Bell long distance lines would be at the service of all Independent exchanges which would accept the connection.

At a conference held at Plymouth a few days ago, 34 of the 50 Independent telephone companies in the district which has its headquarters at that place met and adopted resolutions which indicate the general sentiment. The substance of the resolutions was that the Independent companies now have a toll service which practically covers the entire district, giving service to 20,000 subscribers, connected to not less than 50 separate exchanges. In the same district the Bell Company has seven exchanges and 3,000 subscribers. At the time connections to outside points were very much needed by the Independent companies they were refused by the Bell interests, which hoped to cripple the growth of the movement. At the present time the acceptance of such a connection, offered to the Independent companies in the hope of securing business from their large list of subscribers, would in fact cripple the investments which have already been made by the associated Independent operators. The resolutions closed with the following words: "Therefore we pledge ourselves, individually and collectively, to refuse connection with the Bell company, which has so long ignored us and tried to ruin our efforts to give popular service, and to sever all toll line connections with any Independent company, in our district, which gives such connection with the Bell."

Previous to the adjournment of the meeting at which these resolutions were passed the president of the district organization appointed a committee of adjustment with power to arbitrate and adjust disagreements and misunderstandings between neighboring companies, the expense thereof to be paid by the companies involved in the trouble. It was also made the duty of this committee to consider demands for toll line improvements and recommend the changes necessary for a first-class toll line service, and the correcting of any shortcomings observable in operating companies.

THE TELEPHONE AND THE ANTI-SALOON LEAGUE.

AT Radcliff, Iowa, Rev. Plummer, a local minister, secured an injunction to prevent the Radcliff Telephone Company from discontinuing his service. The manager of the telephone exchange was a druggist who was recently indicted and tried for alleged illegal selling of liquor. The minister was active in securing evidence and was also an important witness on the trial. The minister alleges that the reason his service was cut off was because of the manager's desire to get even with him for his activity in prosecuting him. The minister has the assistance of the Hardin County Anti-Saloon League in his injunction suit. The proceedings went so far that the manager was arrested and tried for contempt of court.

ACTION OF COMMITTEE OF INTERNATIONAL TELEPHONE ASSOCIATION REGARDING BULLETIN OF THE LEAGUE OF AMERICAN MUNICIPALITIES.

SEVERAL prominent Independent telephone men were present at the Convention of the League of American Municipalities, held in Chicago recently on behalf of the International Independent Telephone Association, for the purpose of taking such action as might be necessary in regard to the attitude of the Independent telephone companies by permitting only articles favorable to Bell and antagonistic to Independent interests to be published in its columns. The representatives of the Association were Charles West, president of the Pennsylvania State Independent Telephone Association; J. B. Ware, secretary of the Michigan Independent Telephone Association; C. B. Cheadle, secretary of the Illinois Independent Telephone Association; and J. A. Harney, assistant secretary of the International Independent Telephone Association.

Mr. Harney, in an official communication, states that it was found inadvisable to bring this matter before the convention, but Mr. MacVicar, secretary of the League and publisher of the Bulletin, was interviewed. He received the Association's representatives very courteously and assured them that the columns of the Bulletin were open to the Independent telephone people for any corrections they cared to offer to articles previously published, or for any matter having a bearing on the telephone situation. He has also written the general office to this effect.

The Association has every reason to believe that the secretary

*NOTE.—A certain distinguished Iowan said that the ambition of most Iowans was to "raise corn" to feed hogs to sell to get more money to buy more land to raise corn to feed more hogs to sell to get more money to buy more land, etc.

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of the League and publisher of the Bulletin is sincere in his offer to permit the Independent cause to be properly presented through the columns of the Bulletin, especially in view of the publication in the July issue of Honorable Francis Dagger's article, "Telephone Competition and Monopoly."

The Association will arrange to furnish the Bulletin with articles properly presenting the Independent cause and invites all who may be in a position to do so to prepare such articles and forward them to its office at Cleveland, or to give facts which could be used in preparing these articles. The Association wishes especially to hear from those companies who have been attacked in the Bell articles that have appeared in the Bulletin.

MORE INDEPENDENT TRUNK LINES FOR CENTRAL NEW YORK.

WIRES between Syracuse and Pulaski have recently been put up, giving service to the Black River Independent Company, which has an exchange in the smaller city. This restores the service which was cut off from the Black River Company shortly after the Ontario Company of Oswego was absorbed by the Bell Company. Within a short time the entire territory lost to the Independents by this arrangement will have been recovered, and business will proceed through the same channels as it did a few months ago. A few weeks ago Binghamton was connected with Syracuse by a new trunk line, and is now being connected through to Scranton, Pa., by lines under construction. Toll facilities in this region are being extended in a way which will be thoroughly appreciated by the large number of subscribers which will be served.

LARGE EXCHANGE BUILDING TO BE CONSTRUCTED FOR HOME TELEPHONE COMPANY AT SPOKANE, WASH.

PLANS for the new building to be erected by the Home Telephone Company at Spokane, Wash., show a structure 71 by 100 feet, two stories in height and of strikingly original design. It will be constructed of brick and reinforced concrete with terra cotta trimmings, at a cost of $60,000, and will be entirely fireproof.

All of the building will be occupied by the telephone company, the first floor being taken up by the office of the manager, the vaults, the counting room and offices of the other officials. The different offices will be separated by partitions of glass and hardwood, and the counting room will be enclosed with regular bank fixtures. The floor will be tile.

On the second floor will be the automatic switchboard, with a capacity of 10,000 lines; the distributing boards; the wire chief's room, the storage battery and machinery rooms. There will be both an electric motor and a gas engine installed, the engine to be used in case of the motor failing.

The contract for the removal of the old buildings now occupying the site has been let, and the excavation contract will soon be awarded. It is expected the building will be completed by May 1, 1907, and that all of the apparatus will be installed and ready for operation by the first of next September.

EXTRA NUMBER LISTINGS ADOPTED IN DIRECTORY OF INDEPENDENT TELEPHONE COMPANY AT COLUMBUS, OHIO.

THE Columbus Citizens' Telephone Company has recently adopted a new form of contract for extra number service, which is believed by the company to be unique. The extra number service consists of printing in the directory in the same line with the name of the subscriber the additional office or residence number as the case may be. For this extra number service the company charges $3 per year. The form used to make application for this special listing is worded in the following terms:

"The undersigned hereby makes application to the Columbus Citizens' Telephone Company for the insertion of an extra number in the next issue of the telephone company's directory, and in subsequent issues until this application is cancelled or revoked and agrees to make payment at the rate of $3.00 per year. The insertion is to consist of 'Office No. ....' or 'Residence No.....' on the same line of print as the full name entry of.....'

"Signed.....'

"If the applicant for said extra number service is not the subscriber for the telephone whose number is given above, then the subscriber for said telephone hereby consents to the insertion covered by this application and agrees to become responsible for the charge hereunder in event of failure of the applicant to pay.

"Accepted:

"The Columbus Citizens' Telephone Company.

"By.....Gen'l Manager.

"Columbus, O.....190..."

The company accepts no contracts for less than six months and the contract is not binding unless signed by the general manager, neither can it be modified or changed in any way by an employe. The entry in the directory then appears as follows:

"5542. Judge John A. Shauck, Res. Telephone No. 5918."

"5257. Boyd, M. L., No. 512 W. Sixth ave., Office 2994."

GOVERNMENT HOLDS EXAMINATIONS FOR TELEPHONE OPERATORS.

ON October 31st at a large number of places throughout the country will be held examinations under the auspices of the United States Civil Service Commission to secure an operator for the Government service. The position is one which is open only to men, and carries a salary of $480 per annum. For this sum the Government expects to obtain a man to fill the position of telephone operator in the United States Penitentiary at Atlanta, Ga., and similar vacancies as they may occur in that branch of the service. The applicants must have had at least one year's actual experience as telephone switchboard operators. Special credit will be given for experience in a large central telephone office as chief operator, supervisor or senior operator. The saving clause in relation to the statement of the salary is that special credit will also be given for experience on the board, which will entitle to promotion to either of these positions.

FARMERS HAVE TROUBLE WITH TELEPHONE COMPANY AT LA PORTE CITY, IA., AND THREATEN TO CONSTRUCT NEW SYSTEM.

FOR some time past the farmers living south and southwest of La Porte City, Ia., have been dissatisfied with the service they have been receiving from the telephone company. Recently the company has disconnected the farmers' lines from its exchange, thus making it impossible for the farmers to communicate with telephone users in Dysart.

It is quite probable that a new company will be started as several meetings have been held and committees have been appointed to make arrangements to perfect an organization and to ask La Porte City for a franchise to enter the city.

In an attempt at conciliation the telephone company has made a proposition whereby the farmers can build their own lines up to the city limits of La Porte, run their wires on the company's poles in the incorporate limits, connect with the company's switchboard and be given all the service of the exchange on payment of a switching fee. With this arrangement the farmer will be required to keep his own telephone and line in repair, and the farmers have not as yet announced that they will be satisfied with the proposed arrangement.

QUESTION OF PUBLIC OWNERSHIP OF TELEPHONES TO BE DISCUSSED AT MEETING OF THE MANITOBA UNION OF MUNICIPALITIES.

AT Portage la Prairie, Manitoba, Canada, on November 6th, 7th and 8th, the Manitoba Union of Municipalities will hold a meeting for the discussion of subjects of importance to the various cities and towns in the province. The second day is to be given over entirely to a discussion of the Government ownership of telephones.

Telephone conditions in the province are very much unsettled at the present time, and there is a great diversity of opinion as to the proper course of action to be pursued in order to obtain the best service at the lowest rates. F. Dagger, the well known telephone expert of Manitoba, will address the meeting, and it is expected that much useful information will be brought out.

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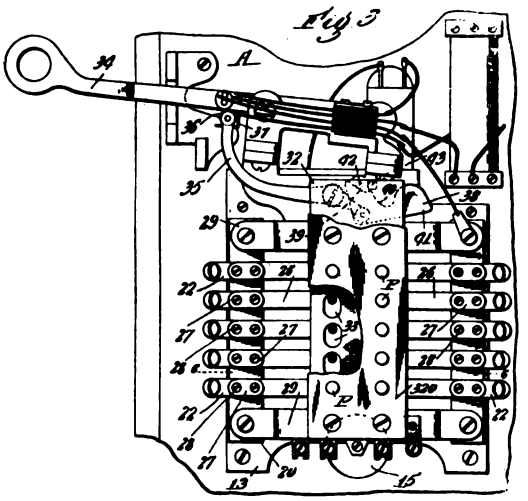
TELEPHONE PATENTS

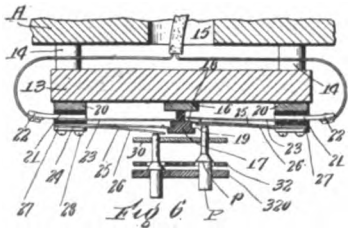
SWITCH FOR INTERCOMMUNICATING SYSTEM.

S. H. Couch, Boston, Mass., patents (No. 830,770, dated Sept. 11, 1906; filed Oct. 2, 1905; serial No. 280,919) an automatic re-setting switch.

Secured to the back *A* is the switchboard 13, which carries the contact springs 22, 23, etc., for the plungers and also the



vertical stop plate 17 for these contact springs. Bridge supports 29 carry three vertical plates; these are the stationary plate 30, which serves as a guide plate for the plungers, the catch plate 32, which is mounted on four guide posts supported on 30, so as to be movable in a vertical plane, and the front plate 320. This front plate registers with an aperture in the front of the box



and remains stationary when the box is opened, thus obviating the necessity of disturbing the mechanism for repairs or tests To make a call the user depresses the desired plunger. The corresponding contact springs are actuated, and at the same time the conical shoulder *P* engages the latch plate 32 and is held. When the receiver is returned to the hook lever 35 is depressed, latch 38 acts on stationary pin 42 and on latch plate pin 43 so as to first raise the latch plate releasing the plunger, and then to let the latch plate fall as pin 43 slides into cavity 40. The instrument is thus left in its initial position ready to receive a call.

FLEXIBLE CONDUIT.

George A. Lutz, New York, N. Y., and Clarence C. Sibley, Perth Amboy, N. J., patent (No. 825,227; dated July 3, 1906; filed March 14, 1905; serial No. 250,053) a flexible conduit.

This conduit embodies a construction which the inventor intends shall prevent the workmen who are laying it from withdrawing the paper lining in order to insert a wire which is too large for the conduit. The spirally wound strip of paper which forms the lining is weakened by cuts made to extend partly across its breadth at short intervals, so that the breaking of the strip at one of these cuts makes it possible to withdraw only a short length at a time.

INSULATOR.

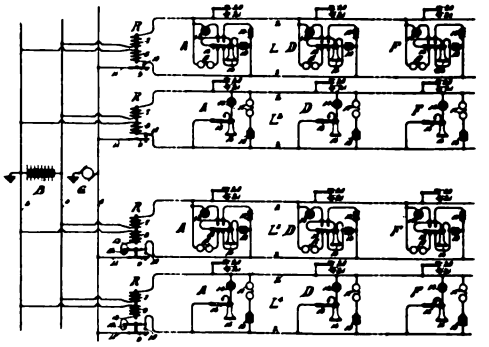
Arthur J. L. Lembeck, Sioux City, Iowa, patents (No. 831,168; dated Sept. 18, 1906; filed Nov. 26, 1904; serial No. 234,412) and assigns one-half to John P. Wall, Sioux City, Iowa, an insulator.

This invention provides for an insulator having two parts and is very similar in form to an ordinary line insulator with an extra knob projecting horizontally from one side. The insulator is intended to be used for connecting fire alarm boxes, house drops, etc., to the line wire at any place where the direction of the line is to be abruptly changed.

TELEPHONE SYSTEM.

William W. Dean, Chicago, Ill., patents (No. 825,894; dated July 17, 1906; filed Feb. 8, 1904; serial No. 192,473) and assigns to Kellogg Switchboard and Supply Co., Chicago, Ill., a telephone system.

A combined party line and intercommunicating telephone system is described. At the exchange a battery B and a ringing generator G are provided. Each party line is connected to the exchange through the windings of differential relays R. If a subscriber desires to call any other subscriber on the same party line he depresses the key 20, thus grounding that side of the line and allowing the current from battery B to flow through winding 7 of the differential relay. The armature 9 is thus attracted and closes contacts 9, 10, allowing ringing current from the generator G to flow over branch 3 of the line through all the substations to ground at 21. When the called subscriber takes his receiver from the hook, the two sides of the line are connected



and the current from battery flows through both windings of the differential relay, which is demagnetized, allowing its armature to fall back and break the ringing circuit at 10. The winding 8 is of sufficient impedance to prevent the short circuiting of the ringing current when the connections are as shown in the two party lines L and L_2. In the other two party lines at the bottom of the figure a form of differential relay is shown which disconnects the coil 8 when the key is depressed and thus insures that the entire ringing current will go over the line and will not be shunted through the relay winding.

RECEIVER-HOOK FOR TELEPHONES.

Denis Howard, Binghampton, N. Y., patents (No. 831,001; dated Sept. 11, 1906; filed Jan. 16, 1906; serial No. 296,417) a receiver-hook for telephones.

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The inventor describes a hook of a form adapted to transmit several successive impulses to be used in connection with a selective signalling system briefly described in the patent. The hook lever is designed to be pivoted near the point where it passes through the box in which the mechanism is contained. At its rear end is provided a segment embracing practically a quarter of a circle, upon the periphery of which are provided a number of metallic projections. These are adapted to make connection, upon the movement of the lever, with a contact projecting from a suitable support.

As the lever forms a portion of the signalling circuit this circuit is completed each time one of the projections touches the contact during the vertical motion of the lever sending a series of impulses over the line. The number of impulses sent over the line will be controlled by the number of projections on the switch hook lever, and thus furnishes a means of regulating the number of clicks produced on listening in upon a party line in such a manner as to indicate the station which is listening.

SELECTIVE SYSTEM.

Sylvanus Albert Reed, New York, N. Y., patents (No. 824,206; dated June 26, 1906; filed Jan. 23, 1905; serial No. 242,311) a selective system.

A four party selective system is described. Two oppositively biased bells are bridged between each side of the line and ground, and at each station a condenser is provided in series between the ground and the bell. At the exchange direct current from the generator is controlled by two rheostats and four ringing keys. The rheostats are provided with revolving brushes and send a current of varying strength over the line. This current changes during each revolution of the bushes as follows: First one strong impulse is sent which charges the condensers and actuates the bell, which is so based as to be responsive. The condensers are then gradually discharged through the changing resistance so as not to actuate the bell of opposite bias. As the brushes are intended to revolve rapidly the bell would vibrate correspondingly. Circuits showing the application of the principles to two and four party selective systems are shown and described in the specifications.

INTERCOMMUNICATING TELEPHONE.

Lambert Schmidt, Weehawken, N. J., patents (No. 832,425; dated Oct. 2, 1906; filed Sept. 16, 1905; serial No. 278,698) an intercommunicating telephone.

The instrument, which is of an unusual form, is shown in Figs.

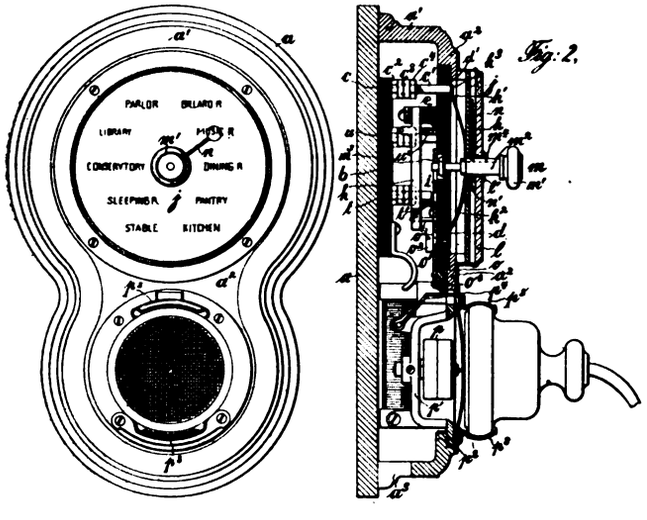
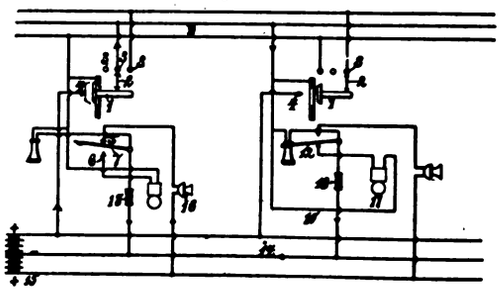


Fig. 2.

1 and 2. Fig. 1 is a front view and Fig. 2 a central longitudinal section. The receiver is shown supported in front of the transmitter by a bracket, whose upper clip actuates a mechanism which serves the purpose of the ordinary hook switch. The button *m* is fastened to the contact spring *k*, providing a handle by which the latter may be revolved to the desired contact stud. The button is then pushed in and closes a call circuit, at the same time actuating the locking rack *i*. The contact dowels are made in one piece with the binding posts *c*, to which the house wires are run.

Referring to Fig. 12 the calling circuits are as follows: The calling station, which is designated by the position of the conventionalized switching mechanism 7, calls the other station by depressing the button 1. The call circuit is then completed from the positive side of the battery through contact 4, contact 3, line 9, conductor 10, bell 11, and then through impedance coil 13 to the common return 14. The transmitter circuit is from the positive side of the talking battery through transmitter 16, contact 5 and through the impedance coil 18 back to the common return. This local circuit constitutes one branch of the Wheatstone bridge method employed. The two stations are connected from

Fig. 12.



the two points midway between the transmitter and impedance coils respectively, the line including both receivers and going through the push button, switch spring and dowel of the calling station, as shown.

INSULATOR.

Salathiel V. Graves and Samuel H. McDaniel, McFall, Mo., patent (No. 830,585; dated Sept. 11, 1906; filed Nov. 14, 1905; serial No. 287,357) an insulator for telegraph and telephone wires.

It is the object of the inventor to provide an insulator with a roof to protect the top of the insulating block from rain or sleet. A block of insulating material is contained in an iron box or casing which is closed at the top by a detachable cover overhanging the sides of the box. The casing has portions of two opposite sides cut away to allow the passage of the line wire. The insulating block is suitably grooved to receive a tie-wire.

TELEPHONE DIRECTORY.

Daniel F. Whitcomb, Cleveland, Ohio, patents (No. 828,161; dated Aug. 7, 1906; filed Nov. 3, 1905; serial No. 285,768) a telephone directory.

Between two discs mounted on a cylindrical member between the mouthpiece and the transmitter case are a number of approximately sickle-shaped leaves of paper or other suitable material which are intended to carry the names and numbers of subscribers. These leaves are pivoted to the front disc near its edge and are provided with projecting ears on which the index letters are printed. To use the directory the subscriber turns the entire attachment until the ear bearing the proper index letter is on the right hand side. He then pushes this ear down and the attached leaf swings out and discloses the desired portion of the directory.

PARTY LINE SYSTEM OF TELEPHONES.

Harry Benwell Stocks, Manchester, England, patents (No. 827,825; dated August 7th, 1906; filed September 5th, 1905; serial No. 276,998) party line system of telephones.

The inventor describes a party line system intended to be controlled by the operator at the switchboard at the central exchange. The circuit changing mechanism is intended to be located at the subscriber's station, and comprises a somewhat complicated arrangement of magnets and movable parts.

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

RELAYS FOR THE PROTECTION OF RINGING CIRCUITS.

IN a bulletin which has been recently issued by the Dean Electric Co., Elyria, Ohio, attention is drawn to one of the points connected with the use of lamps in ringing leads as a protecting resistance, so that when a short circuit occurs in the key shelf or when the operator rings on a crossed or grounded line other operators will not be robbed of their share of current, and apparatus will be protected from damage. When the filament of such a lamp is hot its resistance is very much less than when it is cold. This makes available only a small amount of current when ringing on long lines of high resistance, the reverse of the condition which should actually prevail.

The Dean company proposes to substitute for the lamp a protection relay constructed as indicated in Fig. 2 and connected into the ringing leads as indicated by the circuit shown in Fig. 1. This relay, connected as it is, acts practically as an automatic overload self-restoring circuit breaker. Normally the armatures on these relays allow the ringing current to flow through a very low resistance shunt *a*, which is bridged around a high resistance winding *b*. If, however, the flow of current to the ringing keys should become excessive, sufficient energy will pass through the winding *b* to cause the magnet to draw up its armature *c*, thus breaking the path through the low resistance shunt, and leaving only the high resistance *b* in that particular circuit. When the cause of the excessive current is removed the current will again drop back to its normal value and the circuit will include the shunt as before. The Dean company especially recommends the use of its protective relay for party line service, and will be pleased to send full information to all interested persons.

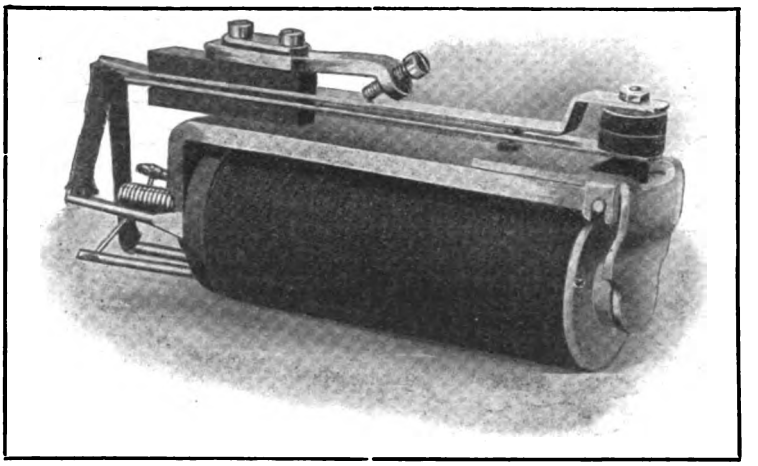

Fig. 2. Relay designed by the Dean Electric Company for the protection of ringing circuits.

FLEUR DE LIS TELEPHONE BATTERIES.

FIFTY amperes output is claimed by the French Battery Company, of Madison, Wis., for one of its Fleur de Lis dry cells of standard size, 2½ x 6 inches. This remarkable product was made in response to a demand on the part of users of dry batteries in automobiles for a cell with heavy initial amperage and also possessed of first class recuperative qualities.

While this special type shows admirably what its manufacturers can do in the way of battery making, it is not suited to the requirements for ordinary telephone exchange work. The company also manufactures three other types—the bell type, with an output of 12 to 15 amperes; the ignition type, giving from 25 to 32 amperes; and the telephone type, from which from 22 to 25 amperes may be obtained. Each of these types is manufactured in a special way, determined by careful experiment, with the object of making a battery as perfectly adapted to the special demands of the service in which it is to be used as is possible.

The fluted form of carbon, which makes it possible to use a very large amount of active material for a given area of surface, the use of high grade material, and careful construction have resulted in the production of a cell in which are combined the essential qualities of high capacity, excellent recuperative power after a long period of constant use, and long life. The company maintains a thoroughly equipped laboratory and is constantly testing its product with the object of keeping it up to the high standard which has been set, and also of making every possible improvement.

Orders from telephone companies have come in so rapidly that they now form a very large proportion of the company's business. It has devoted special care to the development of a cell which will give satisfaction under the most severe conditions of telephone service, and at the same time be durable and economical. Its success in this line is indicated by the size of the orders which are being received and the expressions of satisfaction which have come from telephone men who have used the batteries.

The company has recently completed its new factory, and is prepared to make prompt shipments. It will be pleased to give details concerning the work of which its cells are capable to all persons who are interested.

THE LORD ELECTRIC CO., which has built up so large a trade in electrical apparatus of various classes, has announced that after Nov. 1st its headquarters and manufacturing plant will be located in New York City. The Boston office will be continued as a branch office. The company will have improved facilities for handling its rapidly growing business and will give prompt attention to orders.

THE CENTURY TELEPHONE CONSTRUCTION CO., which has recently opened offices at 53-9 Adelaide street, Toronto, Ont., Can., has just secured a large order to equip an Independent telephone exchange at Ingersoll, Ontario.

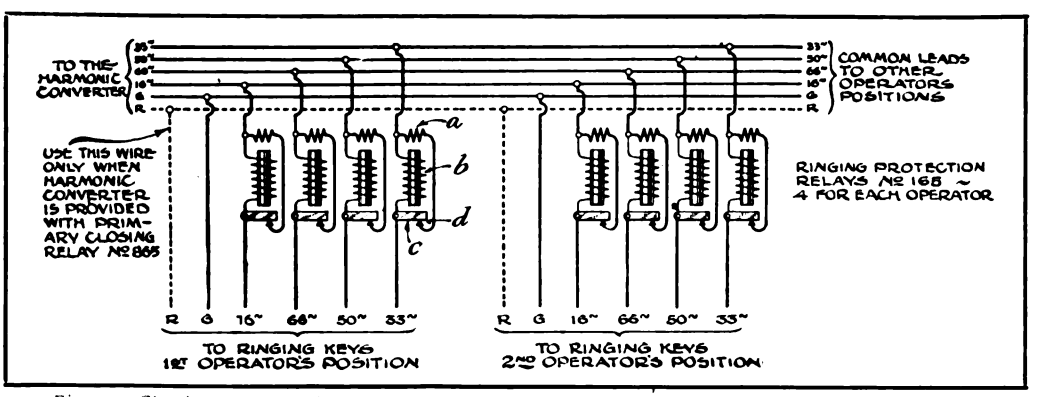
TO THE HARMONIC CONVERTER
COMMON LEADS TO OTHER OPERATORS POSITIONS
USE THIS WIRE ONLY WHEN HARMONIC CONVERTER IS PROVIDED WITH PRIMARY CLOSING RELAY No 865
RINGING PROTECTION RELAYS No 165 ~ 4 FOR EACH OPERATOR
a
b
c
d
R G 16~ 66~ 50~ 33~
TO RINGING KEYS 1st OPERATORS POSITION
TO RINGING KEYS 2nd OPERATORS POSITION

Fig. 1. Circuit wiring of relays used by the Dean Electric Company for protection of ringing circuits.

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GRAY PAY STATIONS PAY

"Simplicity Did It"

Clear Signals by Simply Dropping in the Coin

Our Measured Service Register Has Proved Itself to be Perfect

GRAY TEL. PAY STA. CO. HARTFORD, CONN.

WRITE US

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

WANTED—Position as manager or superintendent of large Independent system in southwest. Six years' experience with large Bell company. Now manager of large exchange. Good reasons for desiring change. A1 references. Address Box 687, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 687

WANTED—Whirlwind salesmen. Men who are resourceful, energetic and capable of commanding large salaries; the kind of men who are not accustomed to take "No" or "We will give you an order the next time you are here" for an answer. For such men we have good positions. We are willing that our salesmen should participate in the profit outside of the question of salary. Apply by letter or in person. Address S. A. Duvall, superintendent Long Distance Telephone Mfg. Co., South Bend, Indiana. 694

THE Dean Electric Company, Elyria, Ohio, is constantly increasing its works, and always on the lookout for first-class young men, experienced in either factory or outside installation work. Make application by letter, stating age, experience, etc. Address Supt., The Dean Electric Company, Elyria, Ohio. 699

WANTED—Man to represent us in the State of West Virginia and surrounding states. One who is thoroughly acquainted with the Independent telephone movement in the state of West Virginia. Would prefer a man who has some knowledge of the telephone business and has influential friends throughout the state. Apply by letter or in person. Address, S. A. Duvall, superintendent, Long Distance Telephone Mfg. Co., South Bend, Indiana. 695

WANTED---Continued

WANTED—A telephone manufacturing superintendent wanted to take charge of tool and manufacturing departments of plant producing high grade telephone apparatus. A thoroughly capable man is required. Address Box 700, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 700

WANTED—Position as engineer or manager by a technical graduate. Seven years' experience. Good references. Address Box 701, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 701

WANTED—Position as salesman handling telephone specialties, wire or cable preferred, by man with several years' experience in telephone field. Age 35; technical graduate. References. Address Box 702, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 702

A CLEAN cut man, age 27, Cornell graduate, four years' experience with manufacturing, construction and operating companies; familiar with theory and practice, wants responsible position. Address Box 703, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 703

WANTED—Wire chief, superintendent of construction and service. One who has had practical experience. Our exchange consists of 1,100 magneto subscribers and toll lines. If you wish to make application for this position state wages and send recommendations. State when you could come. Address The Solomon Valley Telephone Co., Beloit, Kans. 704

The Debutante.

THE DEADLY PARALLEL

BAIRD FEATURES	"AUTOMATIC" FEATURES
1. Powerful Lever Action.	1. Gravity Action.
2. Cash Register.	2. None.
3. Rejector.	3. None.
4. Sheet Steel Construction.	4. Cast iron and cast lead.
5. One clear signal tone.	5. Various musical tones.
6. All signals loud.	6. Some weak, some loud.
7. One coin at a time.	7. Coins deposited rapidly confuse.
8. Portable sets very light.	8. Portable sets very heavy.
9. Combination lock.	9. Ordinary key lock.
10. Unbeatable signals.	10. Easily beaten signals.
11. With Power improvement and progress are possible.	11. With gravity action progress is practically impossible.

Write for Bulletins Nos. 86 and 51

BAIRD MANUFACTURING CO.

1506 BRIAR PLACE, CHICAGO

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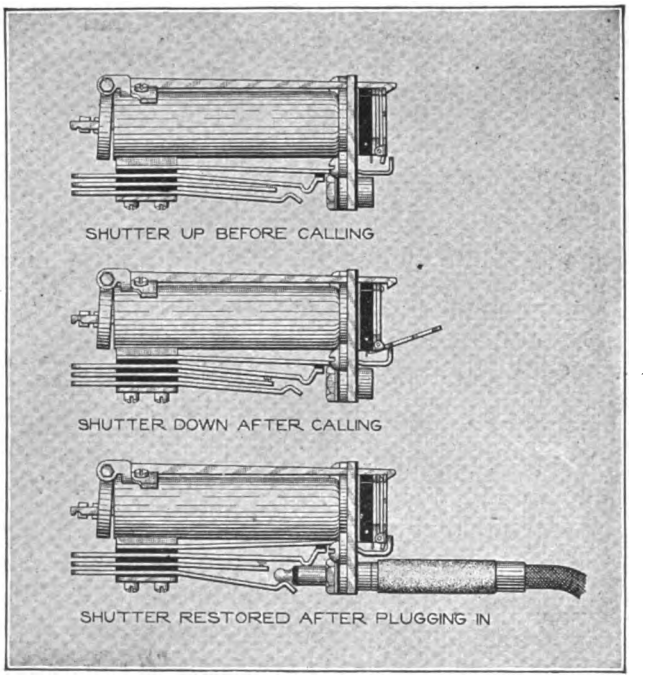
IN THE MANUFACTURING FIELD

TERMINAL APPARATUS FOR MAGNETO SWITCHBOARDS.

AN ingenious combination of line drop and jack has been devised by the Automatic Electric Company, Chicago, Ill., for its magneto switchboards which have recently been put on the market. The combination is so put together that the act of inserting a plug in the jack to answer a call restores the shutter of the drop mechanically.

In the illustration in the center of the page three typical positions of the drop are shown and the construction and arrangement of the apparatus is very clearly indicated. The spring which engages with the drop shutter is carefully insulated from all other parts of the drop and its function is a purely mechanical one. In making and assembling this apparatus the company states that only the best material and the most careful workmanship are employed. The shell of the drop is made of one piece of drawn metal and the armature is constructed of the best grade of soft iron, while the bearing for the pivot points is made of a bushing of German silver driven into the armature. This does away with the risk of trouble caused by the rusting and sticking of the armature. Another useful feature embodied in the construction of the jacks is the provision of a separate spring for each side of the line. The sleeve thimble which forms the bearing for the plug is insulated from the mounting strip and is used as a bearing only. In case of trouble the removal of two screws allows a drop and jack to be taken from the mounting strip without interfering with the other drops.

Many other interesting details regarding the construction of the new magneto switchboards are described in a special book, which will be sent by the Automatic Electric Company to interested persons.



Combined Drop and Jack Used by the Automatic Electric Company in Its New Magnetic Switchboards.

J. A. RUSSELL, whose attractive personal qualities brought him the friendship of many telephone men during his connection with the Swedish American Telephone Co., has recently joined the Sales Department of the Automatic Electric Co., Chicago, Ill.

TECHNICAL INFORMATION FOR TELEPHONE MANAGERS FREE OF CHARGE.

ANNOUNCEMENT has been made within a few days by the Century Telephone Construction Co., 332 Ellicott street, Buffalo, N. Y., of the opening of a new department which should be extremely useful to exchange managers. The duty of this department is to answer inquiries relating to methods of clearing trouble and accomplishing results in exchange work. Inquiries from managers of exchanges who wish to obtain information of this sort will receive careful attention, replies being illustrated with diagrams where necessary. This work will be under the direction of a thoroughly competent engineer, and all information will be furnished by the company without expense to inquirers.

ANNOUNCEMENT OF THE SECOND CHICAGO ELECTRICAL SHOW.

JANUARY 14th to 26th, 1907, are the dates established for the second annual Chicago Electrical Show. The management of the Electrical Trades Exposition Co., under whose auspices the extremely successful show of last year was held, has just issued a booklet calling attention to the various features which will make the coming exposition valuable to the electrical industry. Notice is given that over 70 per cent. of the space covered by the 1906 show has already been contracted for by those who wish to exhibit their goods during the coming show. In addition to the Coliseum, the annex adjoining will be utilized for the exhibit this winter. Spaces are laid out in sizes suitable for small or large exhibits and the needs of every exhibitor can be met. A diagram showing arrangements and dimensions of spaces may be obtained on request.

It is expected that a number of prominent electrical associations will hold their conventions during the progress of the show. The booklet which the company has issued gives information concerning the purpose and features of the coming show and contains a number of letters from prominent manufacturers stating the advantages which they had reaped from their exhibit last year. It is illustrated by numerous views of attractively arranged exhibits. All persons who are interested in the coming exposition may obtain copies by writing to the Electrical Trades Exposition Co., 139 Adams St., Chicago, Ill.

CHICAGO AGENCY OPENED BY THE FRENCH BATTERY COMPANY.

THE French Battery Company, manufacturers of the "Fleur de Lis" dry battery, whose factory is located at Madison, Wis., has found the demand for its goods from men accustomed to buying in Chicago to be so heavy that it was deemed desirable to open an agency for the sale of its batteries at that place.

A. J. Cox & Company, Stock Exchange Building, Chicago, Ill., have been appointed to handle the company's product. This battery is especially prepared for high class telephone work, and its manufacturers report that sales have up to the present time been very large. The appointment of its Chicago agents is expected to bring about very considerable extensions of business, as the firm of A. J. Cox & Company is well known in the telephone field, and has acquired an excellent reputation by handling goods of the best quality.

MR. DONALD P. CRITCHFIELD, formerly of the Automatic Electric Company and later connected with the Citizens' Telephone Company of Columbus, Ohio, and also Mr. R. S. Wilber, formerly with The Sterling Electric Company and recently connected with the Albany (New York) Home Telephone Company, have recently joined the engineering staff of The American Automatic Telephone Company, of Rochester, N. Y.

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UNITYPE METHOD OF COMBINING AND MOUNTING DROPS AND JACKS

A metal frame is provided in which the jack strips and drops are placed. One end of this frame is shown at "M," Figure 1. The jack strips slide in grooves cut in this frame. A small slotted punching "N" slips freely over the screw "C." To remove a jack strip from the board it is only necessary to loosen screw "O," move pieces "N" and pull the jack strip out. About 3 feet of cable is allowed to each jack strip, and *each strip can be removed this far from the board without unsoldering or removing a single line wire.*

The drops are placed upon the mounting plate "C," and are locked in place by the two projecting contact springs on each drop, which connect with the inside contacts of jack "K." When in place the drops appear as shown by rear view, Figure 2.

From the above it will be seen that a drop can be instantly inserted or withdrawn from the front by simply *pulling it out,* as there are no wires to disconnect or screws to remove. This is a UNITYPE feature exclusively.

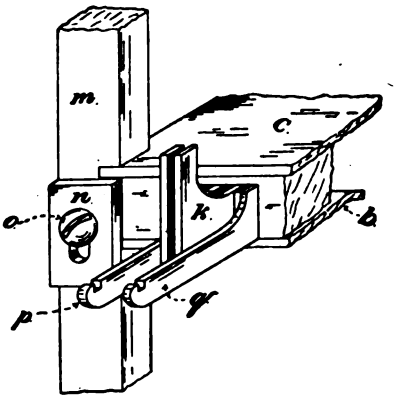
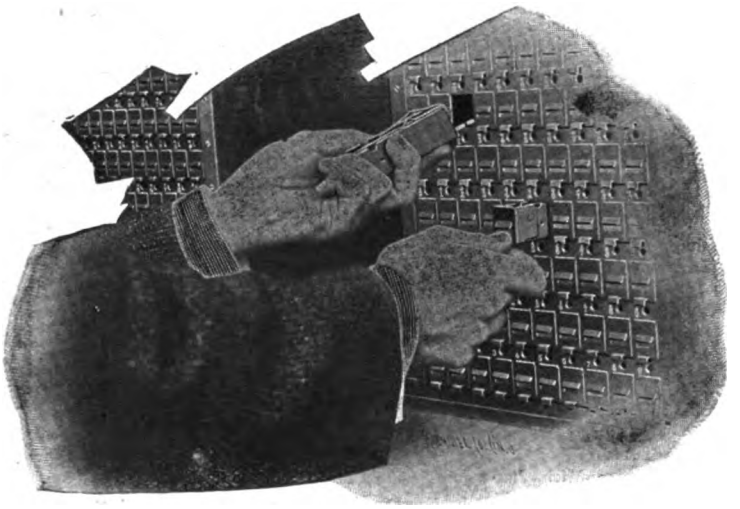


Fig. 1. End of Jack Strip.



Removing a Unitype Drop. Just Pull Them Out.

GET OUR BULLETINS

The SUMTER TELEPHONE MFG. CO.

Sumter, S. C.

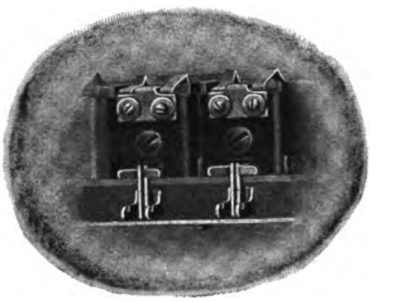
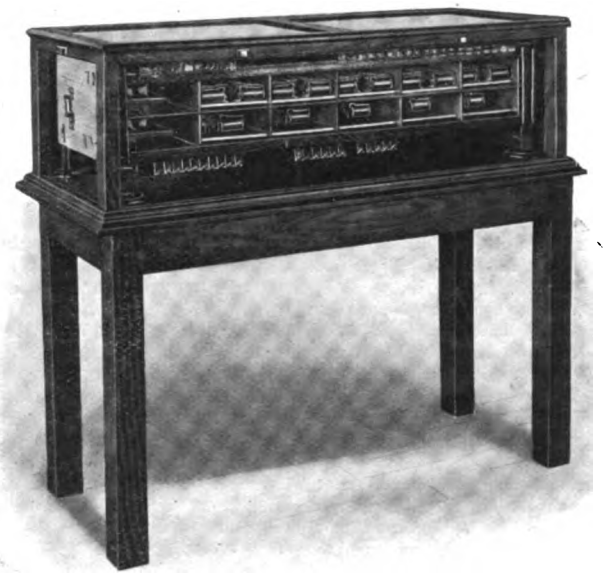


Fig. 2. Showing Connection Between Jack and Drop.

SWITCHBOARD SPACE COSTS MONEY



Our Two Wire System Automatic Switchboard requires less space than any other, whether automatic or manual. Therefore its use means either reduced rental for exchange quarters, or less invested in exchange buildings. Either item figures in the cost of production and consequently in the profits.

The illustration shows our 50-line board. Its dimensions are 48 ins. long, 13 ins. high, 18 ins. wide. Some idea of the wonderful compactness of our boards may be formed by the fact that a 10,000-line board requires a floor space of only 25 feet square (six hundred and twenty-five square feet). Other automatic boards of the same capacity require as many thousand, or more, square feet.

The frame is made of substantial angle steel, and each switch is provided with its own compartment, there being steel separators between each switch pocket. The switches can be pushed in and pulled out like drawers in a cabinet. They automatically connect themselves to their proper bank jacks when inserted. It takes only a second or two to remove a switch and replace it by another, all switches of a particular class being interchangeable. Adjustment of switches may be made at a convenient testing table, and switches so adjusted need no further attention when inserted in the board for service.

It will be noticed that this form of frame and switch is an important feature, each forming as it does a dust protector for its next neighbor below, thereby, in conjunction with the case, entirely eliminating the dust problem, which is a particularly troublesome element in other automatic systems.

AMERICAN AUTOMATIC TELEPHONE CO., 200-206 South Ave., Rochester, N. Y., U. S. A.

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NEW COMPANIES.

BYRON, CAL.—A Farmers' Telephone Company, which is being formed in the vicinity of Byron, intends to build lines to Antioch. The company expects to cover the entire farming district, with central offices at Byron, Antioch, Brentwood, Oakley and Knightsen.

DE KALB, ILL.—The Exchange Telephone Company, of De Kalb, Ill., has been incorporated with a capital stock of $25,000. The incorporators are B. F. Wyman, A. S. Bean and V. A. Glidden.

HARMON, ILL.—The Green River Telephone Company, of Harmon, Ill., has been incorporated with a capital stock of $2,000. Among the incorporators of the new company are E. Cotton, C. F. T. Ribordy and C. F. Brooks.

GALVA, IA.—The Ida County Mutual Telephone Company has been incorporated with a capital stock of $5,000.

LA PORTE, IA.—The farmers of Bruce Township, Benton County, and Geneseo Township, Tama County, are organizing a farmers' telephone company, the preliminary steps of the organization having already been taken. The promoters of the company are well-to-do farmers and considerable money will be invested in the enterprise. The council of the city of La Porte will be asked for a franchise to permit the company to do business at that place.

WEBSTER CITY, IA.—The Martin Telephone Company has filed articles of incorporation, placing its capital stock at $200,000. The stock is divided into 4,000 shares at $50 each, the shares being full paid and non-assessable. The headquarters of the company will be in Webster City. The incorporators are E. H. Martin and M. M. Martin.

RANDALL, KAS.—Articles of incorporation have been filed by the Farmers' Telephone Company, of Randall, Kas. The capital stock of the new company is placed at $10,000.

BARDSTOWN, KY.—An Independent telephone company has been organized at Bardstown. A large amount of local capital is back of the organization and the construction of its system at Bardstown will begin at once. It is the intention of the company to build lines to all points in the county.

GOURD, KY.—The Line Fork-Leatherwood Telephone Company, with a capital stock of $5,000, has been organized. The new company contemplates the erection of lines from Gourd to Line Fork and Little Leatherwood.

EATON RAPIDS, MICH.—Articles of incorporation have been filed by the Onondaga and Eaton Rapids Telephone Company, of Eaton Rapids. The company has a capital stock of $3,500.

GRAWN, MICH.—The Farmers' Rural Telephone Company, of Grawn, Mich., has been incorporated with a capital stock of $5,000.

TRAVERSE CITY, MICH.—The farmers on the peninsula have organized a Farmers' Telephone Company with the following officers: President, H. E. DeGraw; secretary, P. F. Lardie.

CORDER, MO.—The Corder and Aultville Telephone Company, of Corder, Mo., has been incorporated with a capital stock of $4,000. The incorporators are F. W. Brand and others.

OSWEGO, N. Y.—The Oswego County Independent Telephone Company, with its principal exchanges in Oswego and Fulton, has been incorporated to carry on operations in the counties of Oswego, Onondaga, Madison, Oneida, Cayuga, Wayne, Seneca, Lewis and Jefferson. The capital stock of the company is $100,000 and the directors are Frederick A. Gage, Edward Quirk, John R. Sullivan, Watson C. Butts, Charles J. Bacon, John Hunter, Charles R. Lee, George W. Brosker, Louis W. Emerich, Robert B. Hunter, Homer P. Marsh and M. L. Powell, of Fulton.

GIBSONIA, PA.—Application is to be made to the Governor of Pennsylvania by John W. Thomas, attorney, of Pittsburg, Pa., for a charter for an Independent telephone company, to be known as the North Pittsburg Telephone Company. It is the intention of the company to establish its headquarters at Gibsonia and the route of its lines is to be in the counties of Allegheny and Butler, Pa. Mr. Thomas is acting on the behalf of Robert M. Gibson, Frederick Burki, Ross R. Glasgow and others.

PITTSBURG, PA.—A charter was secured at Washington, Pa., by T. B. Lee and W. H. Bailey, of Pittsburg, Pa., for a new telephone company to be known as the Waynesburg, Jefferson and Carmichael Telephone Company. The capital stock is placed at $1,000. Others interested in the new organization are Lorenzo G. Warfield, J. B. Rohrer and F. L. Ward.

FREDERICKSBURG, TEXAS.—The formation of a new Independent telephone company to construct a line from Fredericksburg to San Antonio is under consideration at Fredericksburg. Among those interested in the project are Judge Clarence Martin and A. Gold, of Fredericksburg, and Alfred Vander Stucken, of Llano.

PROSPERITY, W. VA.—A number of the farmers of East Finley and Morris townships have formed a farmers' telephone company and will construct a telephone line from Prosperity to Pleasant Grove and from East Finley to Burnsville. The lines of the company will connect with those of the Claysville Telephone Company, which will furnish toll connections as well as a local Claysville service.

JORDAN, ONT., CAN.—The Niagara District Telephone Company, with a capital stock of $10,000, has been incorporated. Its principal offices will be at Jordan, and the following directors have been elected: C. Wismer, Alonzo Culp and Alexander Troup, all of the township of Louth.

FRANCHISES.

BERKELEY, CAL.—The Home Telephone Company has made application to the town trustees of Berkeley, Cal,, for a franchise to operate in that city.

EVANSVILLE, IND.—The application of the Citizens' Telephone Company for permission to construct a telephone system in Evansville is being considered by the city council.

ALBION, MICH.—The Homer Independent Telephone Company, of Homer, Mich., has applied for a franchise to enter the city of Albion.

HACKETTSTOWN, N. J.—The newly organized Hackettstown Telephone and Telegraph Company has secured the right of way to build from the Sussex county line, near Allamuchy, to Hackettstown. The company has also applied for a franchise to build lines in Hackettstown. Those at the head of the new enterprise are William A. Hoffman, president; Charles W. H. Dedrick, treasurer.

GREEN SPRING, O.—The Green Spring Telephone and Electric Company, of Green Spring, has increased its capital stock from $35,000 to $40,000.

LINDSAY, ONT., CAN.—Application has been made by F. D. Mackay, manager of the Canadian Machine Telephone Company, of Edmonton, Alberta, Canada, for a telephone franchise at Lindsay. An exclusive franchise is not asked for by the Canadian Machine Telephone Company, simply the right to enter the city and invest its money, with the idea of demonstrating the advantages of an Independent system.

FINANCIAL.

MARSEILLES, ILL.—At a recent meeting of the Marseilles Telephone Company it was decided to increase the capital stock from $4,000 to $12,000. The corporation not being a close one the stock is being offered for sale.

BATTLE CREEK, NEB.—The capital stock of the Battle Creek Telephone Company has been increased to $30,000.

CLEVELAND, O.—The United States Telephone Company, of Cleveland, has increased its capital stock from $4,500,000 to $5,000,000, the increase being 6 per cent preferred, redeemable January 1, 1913. It is stated by James S. Brailey, Jr., president of the company, that the increase was provided for last June, when the company was reorganized, but, owing to the work incident to rearranging the affairs of the big merger, application had not been made to the Secretary of State for a change in the company's charter. The $500,000 additional stock is to be used in the final payment for the companies that have been taken over by the United States Telephone Company.

BUTLER, PA.—At a meeting held by the directors of the People's Telephone Company, of Butler, Pa., it was resolved that the company should borrow $50,000 to be used for the improvement of its system and that the

NEWS—WANTED

THE matter contained upon the message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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BELDEN WIRE and CORDS

We can ship TO-DAY the size of wire you need. We make Copper and German Silver Magnet Wire, Switchboard and Jumper Wire, Telephone Cords, Rosin Core Solder, Magnet Winding Machines, Revolution Counters, Electro-Magnets, etc.

Write and tell us what you use and we will send you a cloth-bound copy of our 1906 Catalog, containing many useful tables.

BELDEN MANUFACTURING COMPANY
194 MICHIGAN STREET CHICAGO

To the Management of
LARGE EXCHANGES NEW OR OLD COS.
We Solicit Your Contracts for
Telephone Accounting and Filing Systems
and Auditing Work

Our experts will take the entire responsibility of furnishing our perfected copyrighted Blanks, Forms, Records and Supplies at lowest market prices, install the system and educate your office force.

N. B. Services reasonable. Correspondence solicited. Give size and scope of your company and present office conditions.

THE Edwards-Hine Co.

TELEPHONE SYSTEMATIZING DEPT.
5 and 7 PEARL STREET (EAST), GRAND RAPIDS, MICH., U. S. A.

Our Price is Right

1st
TELEPHONE MADE

with all connecting wires, binding posts and terminal screws fully concealed

To Prevent Trouble

and with no exposed metal parts in the circuit to

Avoid Danger

from lightning while using the instrument. Send us your inquiry and we will "SHOW-U" at our expense an interesting proposition.

INTERNATIONAL TEL. MFG. CO.
Harrison and Clinton Sts., Chicago

MICHIGAN WHITE CEDAR POLES

In addition to the several yards we have had in the past, we wish to call your attention to our new yard which is located at Escanaba, Mich.

The acquisition of this new yard enables us to ship poles by all railroads or by the lake routes, thereby enabling us to give the best delivered prices.

The location of our new yard makes it easier to secure cars, thus facilitating prompt shipment.

In many cases poles can be shipped by car-ferry, making possible a great saving in cases of shipment to Eastern points.

We are wholesalers exclusively, shipping in car lots only.

Write us for delivered prices and "Pole Booklet No. 3-A." Yours for the asking."

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SWITCHBOARD & SUPPLY CO.
CHICAGO, ILL.

ONE YEAR'S SUBSCRIPTION
TO THE
American Telephone Journal
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Vol.	1.....	November 25, 1899.
"	2.....	February 3, 1900.
"	2.....	August 25, 1900.
"	2.....	September 15, 1900.
"	2.....	September 22, 1900.
"	2.....	September 29, 1900.
"	2.....	October 6, 1900.
"	2.....	December 6, 1900.
"	2.....	December 27, 1900.
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sum be raised by the sale of bonds to be issued by the company, the denomination of such bonds to be from $100 to $1,000 and to bear interest at the rate of 5 per cent. per annum exclusive of tax, interest payable semi-annually, said bonds to be made payable in ten years with the option reserved to the company to redeem any or all of the bonds at the end of any interest paying date.

COMBINATIONS.

SOUTH LYON, MICH.—The plant of the South Lyon Telephone Company, which has been in operation for three years, has been acquired by the Livingston Home Telephone Company.

SALISBURY, MO.—The Salisbury telephone plant has been purchased by J. C. Belshe, formerly owner of the Milan Telephone Exchange and will be greatly improved under his management.

JOHNSTOWN, PA.—The Johnstown Telephone Company, which has connections with Scalp Level, Windber, Salix, Dunlo and other places, has acquired the Lorain Steel Company's exchange, hitherto operated independently, and will conduct its operation in the future.

ELECTIONS.

DAVENPORT, IA.—The German Mutual Telephone Company, which operates lines from Grand Mound to Walcott, at its annual meeting elected the following officers: President, Charles Paustian; vice-president, J. Greve; secretary, P. Blunk; treasurer, G. Alf.

JOPLIN, MO.—The Home Telephone Company at a meeting recently held at Joplin elected the following directors: Breckinridge Jones, St. Louis; R. E. Frye, Carthage; Theodore Gary, Macon; W. H. Warren, Joplin; A. F. Adams, Joplin.

MISCELLANEOUS.

WHITING, IA.—The New State Telephone Company has recently installed a new switchboard at Whiting, Ia., to take care of its long distance business. This will enable the company to give a greatly improved service.

SPOKANE, WASH.—It is proposed by the Interstate Telephone Company, of Spokane, which secured a franchise at Post Falls some four years ago, to install a local exchange system at that point.

PERSONAL.

C. A. WAGNER has been made manager of the Inter-State Telephone Company's exchange at Mt. Holly, N. J.

E. M. RODGERS, formerly of Jonesboro, Ind., has been appointed manager by the Rocky Mountain Telephone Company, with headquarters at Boise City, Idaho.

F. S. EATON has been made manager of the local exchange of the Ellis County Independent Telephone Company of Waxahachie, Texas.

GEORGE DREW has been appointed manager of the exchange of the Nebraska Telephone Company at Seward, Neb.

L. L. CONN, formerly local manager for the Union Telephone Company at Durand, Mich., has been promoted to the position of assistant manager of the company's exchange at Alma.

New Construction in the Field

GADSDEN, ALA.—A line between Gadsden and Turkeytown has been constructed by the Turkeytown Telephone Company.

SANTA ANA, CAL.—Construction of an elaborate system of lines, covering Orange county from Tustin on the south to the county line on the north, has been commenced. A new switchboard, which will double the capacity of the local exchange, is also to be installed.

MASCOUTAH, ILL.—The Looking Glass Prairie Telephone Company is constructing a telephone system at Mascoutah.

COUNCIL BLUFFS, IA.—The Independent Telephone Company, which is now building a new toll line from Council Bluffs to Shelby, is also erecting lines to Des Moines, Red Oak and Shenandoah.

NEVADA, IA.—A line connecting Nevada with Maxwell is being constructed by the Nevada Mutual Telephone Company, and it is also the company's intention to extend its lines to Cambridge.

OAKLAND, IA.—The Oakland Telephone Company, a rural line, has formed connections with the Belle Plaine Telephone Company, of Belle Plaine, Ia.

ELLINWOOD, KAS.—Connections have been established between Ellinwood and Claflin by the construction of a rural telephone line.

MT VERNON, ME.—The Maine Telephone Company, which recently purchased the Crosby lines, has rebuilt many of the old lines and has also built a number of new lines.

CASS CITY, MICH.—The Moore Telephone Company is constructing a line from Cass City to Elkton and Bay Port.

FORT CALHOUN, NEB.—The lines of the Mutual Telephone Company are being extended in Fort Calhoun.

PLYMOUTH, N. H.—The Baker River Telephone Company is constructing a telephone system at Plymouth.

HOPE, N. M.—The lines of the Artesia Telephone Company are to be extended from Hope, N. M., to Cloudcroft.

BINGHAMTON, N. Y.—The New York State Independent Telephone Company, of Binghamton, which has recently completed a trunk line of about eighty miles between Binghamton and Syracuse, is also building a line between Binghamton and Scranton, Pa.

NELSON, N. Y.—A telephone line is being built by the Newton Telephone Company from Nelson to Fenner Corners.

PULASKI, N. Y.—The Syracuse Independent Telephone Company is erecting a line between Pulaski and Syracuse. An exchange has also been installed at Central Square.

MASSILLON, O.—Many improvements are to be made in the system of the Massillon Telephone Company, including the installation of a new switchboard at an early date.

WADSWORTH, O.—The Star Telephone Company contemplates the rebuilding of its entire system. A new switchboard is also to be installed.

WARSAW, O.—The Citizens' Telephone Company is making many improvements in its system, among which may be mentioned the stringing of about 3,000 feet of cable and the installation of new siwtchboard equipment.

YOUNGSTOWN, O.—Many improvements are planned for the system of the Youngstown Telephone Company, the cost of which it is estimated will be about $100,000.

ROCK HILL, S. C.—Among the many improvements planned by the Rock Hill Telephone Company in Rock Hill may be mentioned the erection of a number of 60-foot poles, the stringing of a large amount of cable and the installation of a new exchange. A strictly up-to-date service will be rendered when the proposed work has been completed.

FORT WORTH, TEXAS.—The Fort Worth Telephone Company intends to erect a large addition to its present building. The new space will add to the company's capacity for service, making the building capable of handling 6,000 telephones. This addition is necessary in order to accommodate the company's increasing business.

HOUSTON, TEXAS.—Permission has been granted by the County Commissioners to the Texas Oil Company to construct a private telephone line along the county road between Houston and Humble. Work on the line will be commenced at once, and it will be carried on under the supervision of the County Engineer.

BELLEVUE, O.—The Local Telephone Company, of Bellevue, O., expects to install exchange equipment and office equipment in its quarters at Greenwich. It also expects to take up its outside construction work at an early date.

SUPERIOR, WIS.—Negotiations have been completed for the purchase of two lots in Superior, upon which the Douglas County Telephone Company expects to erect its new exchange building. The company will at once commence extensive improvements, it being estimated that in the neighborhood of $150,000 will be required to carry on this work. These improvements, it is stated by Manager Speechley, will necessitate an entire new plant. It is probable that the long distance board will be in Superior after the plant is completed.

WHEELING, W. VA.—The Belmont and National Telephone Companies are laying a submarine cable across the river at Bellaire that will make a big improvement in the Belmont service from Bridgeport to Wheeling, and from Martin's Ferry to Wheeling. The cable will contain 25 pairs of wires. The expense is divided between the Wheeling and Bellaire companies.

PINCHER CREEK, ALB., CAN.—A telephone system is to be installed at Pincher Creek, Alb., Can., by J. E. Woods, manager of the Municipal Water Works and Electric Light Company.

MERIDA, YUCATAN, C. A.—There is projected in Merida, Yucatan, the construction of a new telephone line to extend throughout the city, and to connect with the port of Progreso.

UNDERGROUND.

BENTON HARBOR, MICH.—At Benton Harbor the Michigan State Telephone Company has asked permission to install a $40,000 underground system.

DETROIT, MICH.—A large amount of underground work is to be done by the Home Telephone Company at Detroit.

COHOES, N. Y.—The Hudson Valley Telephone Company is placing its wires underground from Waterford to Cohoes.

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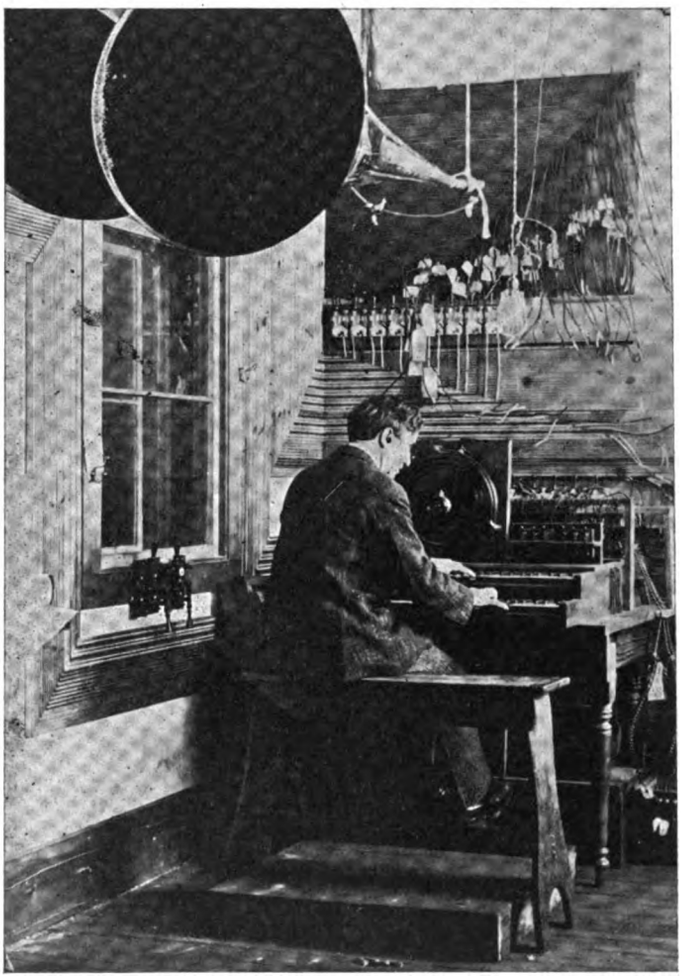
The Electrical Generation of Music

By John Grant.

IN an Ohio village in the eighties a young lad, Thaddeus Cahill by name, experimented with Bell's telephone. He wished to transmit music. In a measure he succeeded, as others had before, but the transmitted tones were poor in quality and feeble in power. He found that when he made the telephone loud speaking, its sounds were coarsened; and when the tones were not coarsened they were so feeble that the telephone had to be pressed tightly to the ear, thus destroying the pleasure of listening to the music.

It occurred to him that instead of copying with the microphone the vibrations of the air produced by the pianoforte or violin, he would produce electrical vibrations at the very beginning—that he would dispense with the piano and violin and make an instrument in which the performer, instead of playing on the keys to control the valves of an organ, or the hammer of a piano, would play on keys controlling electrical sources.

The work thus begun was continued later when boyhood ripened into manhood, and after many years of perseverance New York witnesses the accomplishment of his purpose. Before this, his extremely interesting plant was installed at Holyoke, Mass. The visitor to one of the hotels in that city was able to visit its ball room, a mile or so away from Doctor Cahill's laboratory, and listen to music which was at will made to have the quality of that which comes from the violin, the cornet or an orchestra comprising players of many instruments. The thing about this which makes it so notable is that the person in the hall was listening to the original music. There was no violin, no cornet, nor any other instrument of the sort which we know. If there were no receiver there would be no music. The sounds first come into existence in the telephone receiver located in a room at a considerable distance from the laboratory.



The Keyboard from which is Controlled the Massive and Complicated Electrical Machinery. Operator Judging the Quality of Music Emanating from the Horn Above.

It is well known that the sound wave which produces the impression of a musical tone upon the human ear is a complex affair. It has three essential characteristics, which determine the identity of a sound. The first is the length of the wave, which establishes the pitch of the note. This corresponds to the number of waves produced in a given interval of time. The second is the shape of the wave, which determines the sound. The last is dependent upon the energy of the wave, corresponding to the amplitude of the vibrations awakened in the atmosphere, and determines the intensity of the sound, making it appear either faint or loud.

The wave of the ordinary musical tone is moreover by no means so simple a thing that these characteristics may be readily recognized, nor can they easily be measured by scientific methods. Each wave has a certain basic form, determined by the fundamental tone. This merges with numerous smaller waves, each of which occurs in one second a number of times which is a definite multiple of the periodicity of the fundamental wave. These wavelets, as well as the wave producing the fundamental tone, have each a definite form and amplitude. Thus a musical note may have a considerable number of overtones, and each of these overtones in turn may vary, so that one can no more tell exactly why a given note produced by drawing a bow over the string of a violin is unlike that which one hears when the corresponding key is struck on a piano than he can say why one of the hues in nature composed of all the six primary colors of the rainbow differs from another resulting from a different combination of the same elements.

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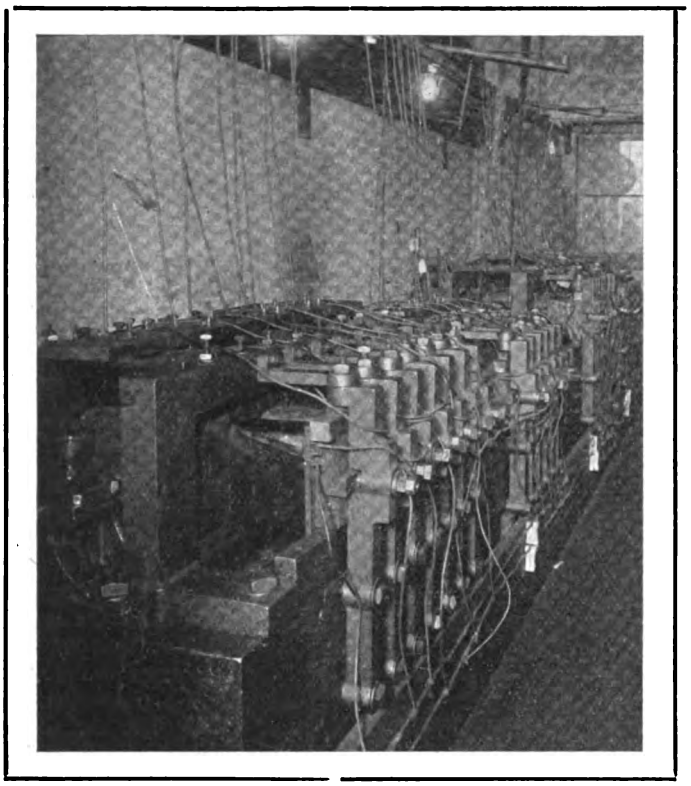


A Battery of Alternators for Producing Waves Corresponding to the Various Musical Tones.

It is this extraordinary difficulty of determining the component parts of a sound that has prevented complete success in the artificial production of human speech by mechanical means, although much patient work upon this problem has been conducted by able scientists. The artificial production of a tone which is accomplished in the telephone receiver depends upon the fact that the original tone, through the medium of the receiver, causes the production in the line of an electrical wave similar in form to the original sound wave. This wave in turn is translated by the operation of the receiver into a sound wave, which has the same characteristics as the electrical wave, and therefore of the original wave accompanying the tone at the remote end of the line. The reproduction, however, is not perfect on account of the distortion produced by the effects of capacity and inductance in the line and receiver. Dr. Cahill, by a most skillful combination of purely scientific invention with practical methods of accomplishment, has succeeded in developing apparatus for the production of an electrical current which may be so controlled

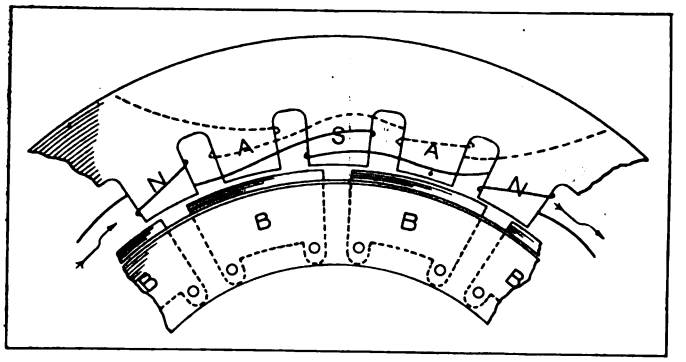
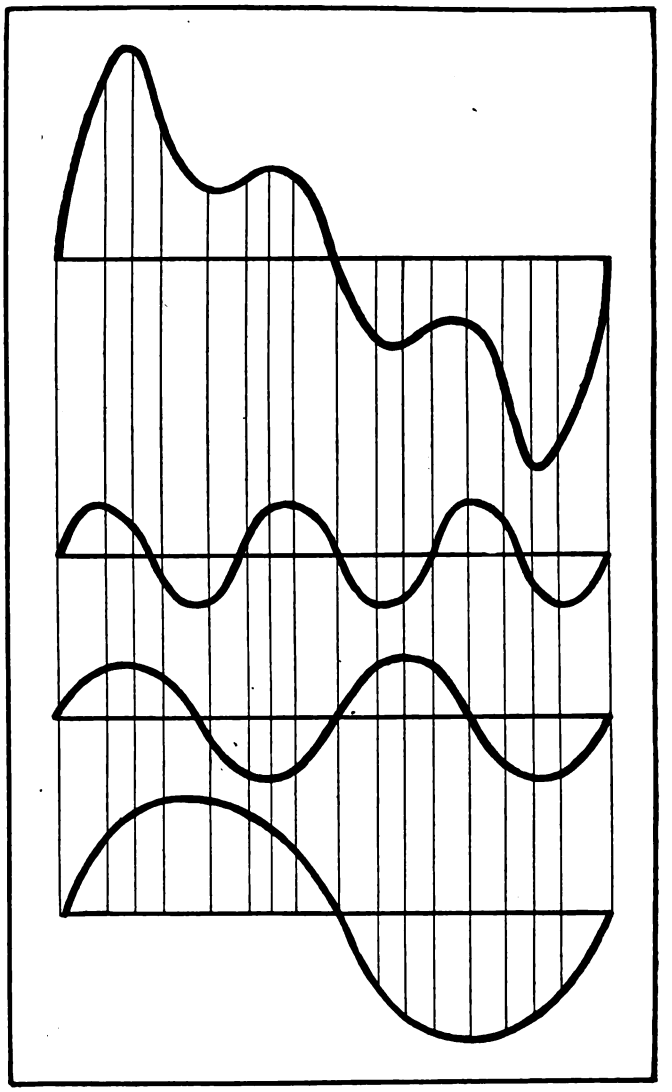


Diagram of Connections of Field and Armature Windings in Generating Unit of the Inductor Type.

as to produce in the line a continuous sequence of waves of almost any desired form, resulting in the production of music by a synthetic electrical process.

The apparatus for generating electrical currents employed by Dr. Cahill consists of a battery of alternating current dynamos of the inductor type. The stators, or stationary parts of the alternators carry both field and armature windings and are each provided with numerous pole pieces, the number of which for each alternator corresponds to the number of teeth in the corresponding rotor. The rate of alternation set up in the armature corresponds to the number of teeth in the rotor and the angular velocity of the shaft. Thus, in the figure there are teeth *A* upon the rotor, which are alternately wound with armature and field coils, the latter being maintained in a state of excitation by a small direct-current machine. Each time one of the teeth, *B*, in the rotor approaches and recedes from the position shown, the current wave in the corresponding armature coil passes through the successive stages from zero to a maximum positive value, thence to a maximum negative value and back to zero, a complete alternation producing a wave of the familiar sine formation taking place while a single tooth passes completely across the gap between field poles of opposite polarity. As the coils are wound



Curves Showing How a Sound Wave for a Musical Tone is Built Up. The Upper Curve is the Sum of Those Below.

so that the currents in all the armature windings are in series, the sum of the currents generated by the passage of the several teeth passes to the line. It is evident that if upon the same shaft there are two alternators, the second having twice as many rotor teeth as the first, it will produce a wave with double the number of alternations, and the corresponding musical tone in the receiver will be the octave of that resulting from the current derived from the first alternator If upon another shaft rotating with twice the angular velocity of the one bearing these rotors there is mounted a set of the same number of teeth as are contained in the second rotor there will be four times as many alternations in the current generated in the first set of armatures, resulting in a note which is the double octave of the one first considered. By proper variations in the number of teeth and

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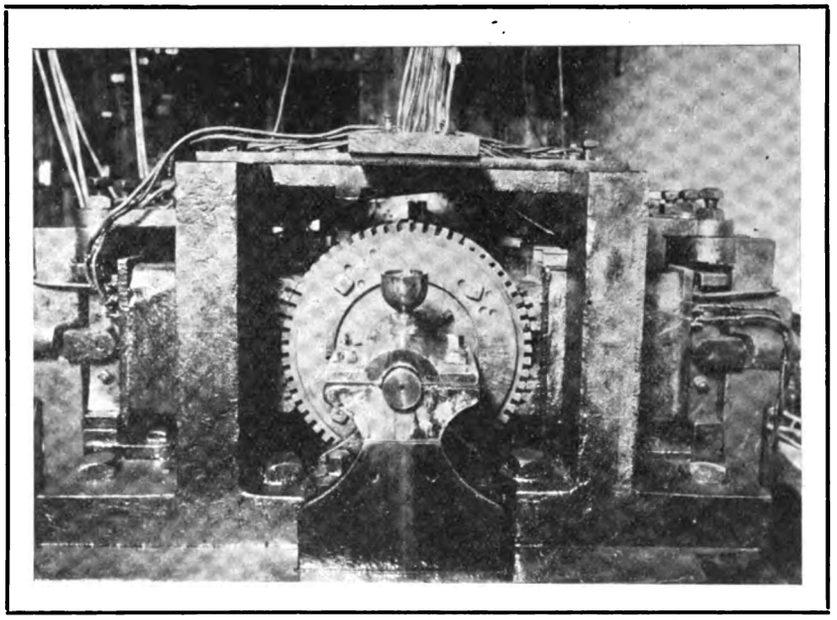
angular velocity of the shaft any fundamental or overtone may be produced by a current having a definite value. What remains to be done, with arrangements made for obtaining the necessary number of pure tones, is so to combine them as to produce the desired composite tones. This is done by "mixing" the fundamentals and harmonics in transformers, each of which is provided with several primaries and a single secondary winding. To produce the desired results the operator manipulates the keyboard, the function of which is essentially that of actuating circuit controlling apparatus. The depressing of keys throws into the primaries of the transformers the currents corresponding to a single ground tone and a number of harmonics. By the use of stops the musician can vary the amount of current entering the various primaries, or leaving the secondaries, thus affecting the intensity of each tone, so that the greatest variety of results may be obtained. Arrangements which permit properly designed inductances to be included in the circuit of a given tone provide for a still further variation in quality of resultant tones. The use of these inductances, and the passing of the current through several inductoriums in succession smooths out any abruptness that might be expected to exist owing to the rapidity with which contacts are made and broken, and a smooth and continuous production is effected.

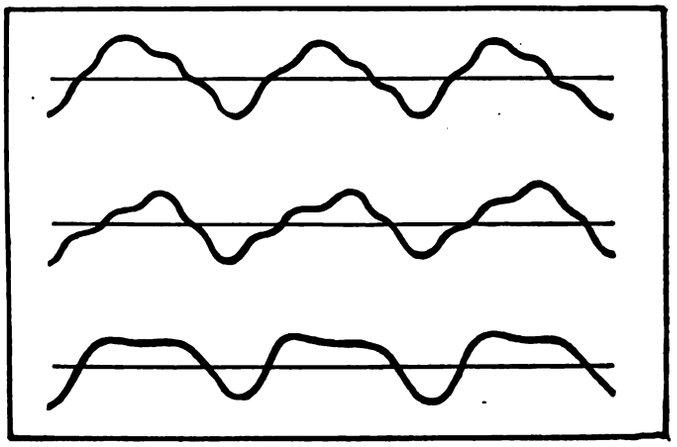
Desired musical results are obtained by an operator through the knowledge obtained by continuous practice and experiment. A receiver and horn is so mounted that he hears the music which is distributed to the distant audience, and knows whether he obtains the proper quality. By listening and trying various combinations a skillful operator soon acquires the ability to imitate the greatest variety of instruments, such as the violin, cornet, organ, fife and drum, even an orchestra or brass band. The purity of the tones, and the exactness of pitch attained are remarkable. As the operator judges his work by ear he is able to so control the shape of the wave as to balance any distortion introduced by the nature of the line, and by this means the perfection of tone at the receiver is secured.

One of the possibilities which is being developed is an absolutely new musical quality. The organ and the violin have limitations; that is, only a certain number and variety of harmonics may be superimposed upon a fundamental tone. The electrical method is likely to produce musical effects which in their pleasing effect will far surpass any tones which are now familiar to the ear. The contrast between the impression of power produced by the large and complicated controlling machinery and the heavy, rapidly moving alternators and the delicacy of expression is not the least remarkable feature of this wonderful laboratory. So perfectly is this remarkable plant under the control of the operator that he can at will produce the most excellent vibrato effects, crescendos and diminuendos unequalled by any instrument other than the violin, tone gliding into tone in perfect cadence, and suddenly by a mere shifting of stops and variation of touch the same keyboard that has caused the observer to hear the low and exquisitely modulated tones of the 'cello is made to convey the effect of a great orchestra playing to thousands.



The Face of One of the Rotors of a Generating Set. On Other Rotors are Different Numbers of Teeth, Corresponding to Desired Tones.

Another thing which is in the way of being an important discovery made by Dr. Cahill is that a telephone is a proper medium for the accurate production of tones backed by what is, when considered in comparison with that of ordinary voice currents, an enormous amount of energy. Sir William Preece has found that a receiver will respond to a current of 6 ten thousand millionths of a millionth $\left(\frac{6}{10,000,000,000,000}\right)$ of an ampere. In the Cahill system, when a loud tone is produced the current passing through the receiver is sometimes raised for an instant to as much as one ampere—millions of times that conveyed to the receiver from an ordinary telephone transmitter.



Electrical Waves Corresponding to Different Tones. Their Exact Duplication in Electrical Waves Must Be Attained.

The practical application of this invention, developed with so much care and enthusiastic patience, is yet to come. Plans are already under way for the erection of a great distributing plant in New York City where the demonstration within the last few days has attracted so much attention. Mains can be laid through the streets and telephones in residences and places of amusement or in churches connected to the circuit by the most simple system of wiring. The wonderful dream of Edward Bellamy expressed in "Looking Backward" will be realized. By the mere turning of a switch the "Sound of violins will fill the room with the witchery of a summer night." Enthusiastic musicians may watch for the development of a new music that shall have a sweetness never attained, transcending the limits of all our instruments with vibrating strings or columns of air by its purity.

From the time of Pythagoras men have known that sounds of different pitch result from differences in the frequencies of the vibrations. The fact above stated, that the difference in quality or timbre, for example, between a human voice and a flute, all producing the same note with the same power, is a difference in the shape of the sound-waves, which in the last result means a difference in the sine-functions into which the vibrations analyze, was established by the investigations of Helmholtz and others more than forty years ago. But science has had singularly little effect heretofore on the development of music. One might almost say it has had none at all. The instruments of music which, with

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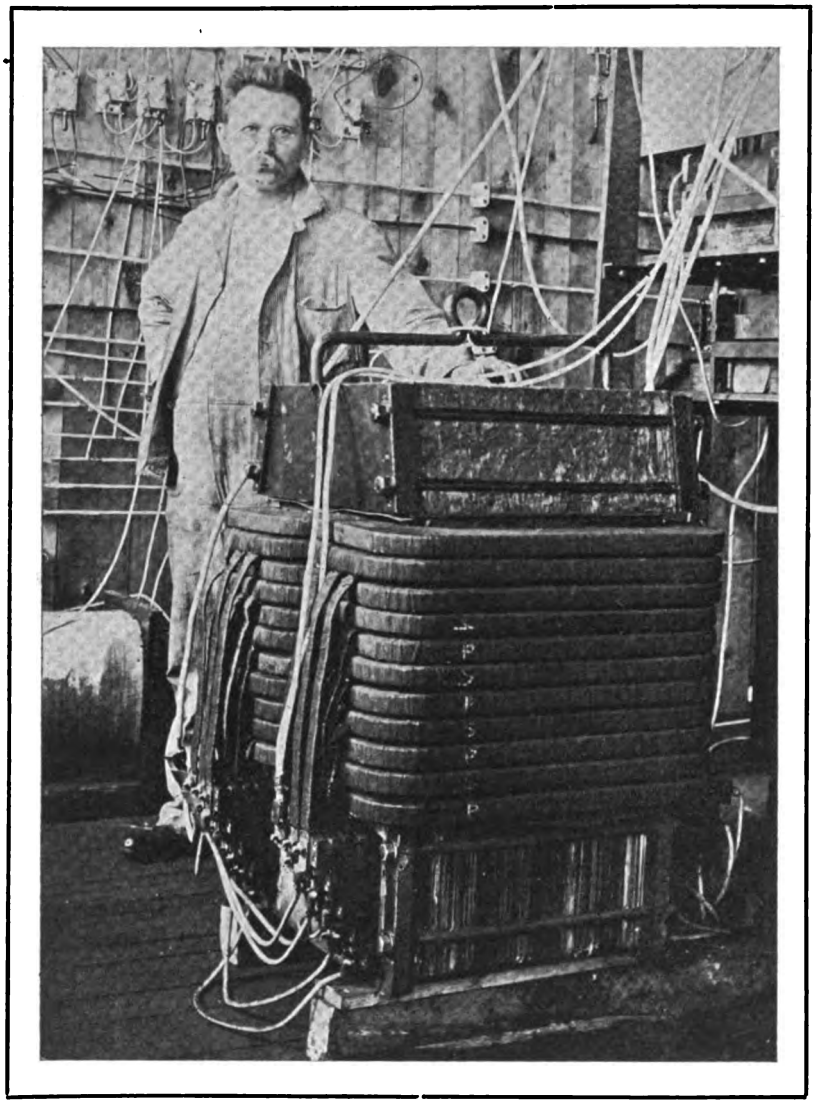
a few exceptions, may be resolved into different forms or combinations of pipes, reeds and strings, admit of good results in the hands of skilled performers, but always with many limitations.

Of all the forces that man has brought under his dominion the force electric is the most flexible, the most controllable. And it is obvious to one who has seen Doctor Cahill's telharmonium that in musical sensitiveness, string and pipe are far inferior to core and coil. Though it may seem strange to some musicians, the same law by which an animal's skeleton limits its development applies also to music, for the instruments of music limit the power alike of composer and executant—the most that the performer can do is to exhaust the resources of his instrument. With the increased power that electricity obviously places in the hands of musicians, our expectations of a new and better music seem to have a solid foundation.



One of the Mammath Inductoriums in which Electrical Waves Corresponding to Fundamental and Partials are Merged to Produce the Ultimate Single Wave Acting on the Receiver.

GERMAN PROFESSOR STUDIES THE TELEPHONE GIRL.

THE hard working telephone girls have a new champion, and one who possesses, at least, the merit of originality. Dr. Wallbaurn, a well-known physician of Berlin, has turned his attention to her case, and has collected and classified the following symptoms:

1. Over - excitability, headache with giddiness, neuralgia of different kinds, and muscular tremors.

2. Symptoms of exhaustion, paralysis of the vocal cords, and pains in the chest.

3. Heart troubles and irregularity of the pulse.

The first two classes are bad enough, but how about the heart trouble? Possibly the subjects may have become mixed, and it was not the telephone girl but some one at the other end of the line who was affected.

THE ARMY TELEPHONE IN THE FIELD.

INTERESTING conclusions based upon observations of the telephone service during the progress of the Russo-Japanese war are given in an article by Col. Neznamov of the Russian army which has been translated for the Journal of the United States Artillery by Capt. William Lassiter.

It is stated that "Experience has shown that the telephone should form part of the equipment furnished to the staff, to regiments, to batteries, etc., at the rate of three or four stations and 10 versts (6.6 miles) of light cable per regiment or division headquarters, three or four stations and six versts of wire per battalion or isolated battery of artillery.

"The equipment of the 'telephone company' (85 versts of line) ought to remain exclusively at the disposition of corps headquarters and suffices for its needs.

"In the present war there has always been an insufficiency of equipment in this respect. In the infantry and artillery there were no telephones at all, or there were very few (two stations and six versts of wire per regiment, and sometimes purchased at the expense of the latter). The equipment pertaining to corps headquarters was withdrawn and put at the disposition of army headquarters, etc.

"We must regard the telephone as especially useful for regimental use while occupying positions, within the divisions and between headquarters of neighboring divisions. For the larger units it is preferable to employ the telegraph because the possibility of talking by telephone with all the subordinate officers leads superior headquarters to wish to know everything and direct everything; and this to such an extent that there often results interference with the initiative of subordinates, a superabundance of orders, embarrassment, and even orders contrary to those of the immediate chiefs."

Test Stations*

By Thomas Stanley.

THE method employed for attaching the cable which enters the test station at the pole is shown in elevation in Fig. 9 and in plan in Fig. 10. In Fig. 9 a fetter drive screw is driven firmly into the side of the pole. The steel core of the cable *b* is brought up over the arm, passed around the pole, then around the drive screw, and secured by four wraps. The butt of the cable is covered by two wrappings of waterproof tape, and bent over so that the conductors descend from the cross arm in a long loop as shown. This loop is designed to allow the water which will follow the conductors down from the cross-arm to drop off, and not enter beneath the tape, and so follow down the conductors under the cable covering. In Fig. 10 is shown the same arrangement in plan. Here the method of fasten-

*Continued from the issue of September 22.

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ing the steel core around the fetter drive screw can be somewhat more plainly seen. As has already been indicated the method of fastening the cable to the side of the cable house is not very clearly shown in Fig. 9. A better view is given in Fig. 11. At the top the scheme is shown in elevation; and at the bottom, in plan. Referring to the upper view, it will be seen that to the house wall is fastened a beam, 3 ins. x 5 ins. in section, and of

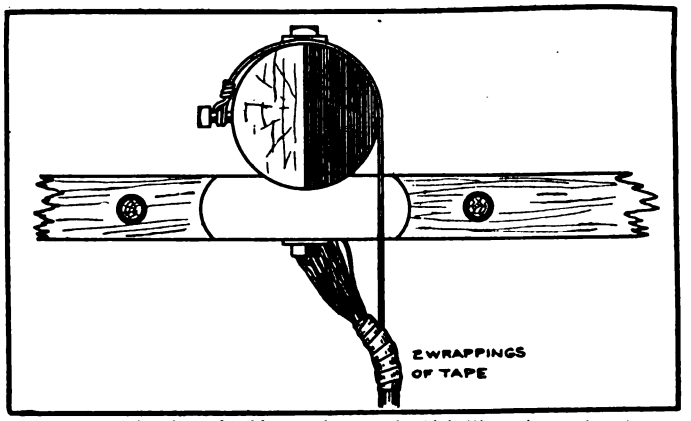

Fig. 10. Plain view of cable attachment of which Fig. 9 is an elevation.

sufficient length to accommodate the requisite number of cables. It is secured by crossarm bolts, which are driven through the house wall and secured in the usual manner. Through this beam are driven fetter drive screws, one for each cable. At a convenient point, located with a view to making the run to the arresters as short as possible, is bored the hole for entrance. It should be located directly beneath the beam, and slope upward in passing toward the interior. In fastening the beam, and making the hole for the entrance of the cable, care must be taken not to injure the clapboards or the framework of the building, as wanting this precaution leaks are sure to follow in bad weather. If the hole is properly placed directly beneath the beam, the latter will form a shield against the entrance of moisture, and the upward slope will prevent whatever moisture reaches the holes from entering the building. At the point where the steel

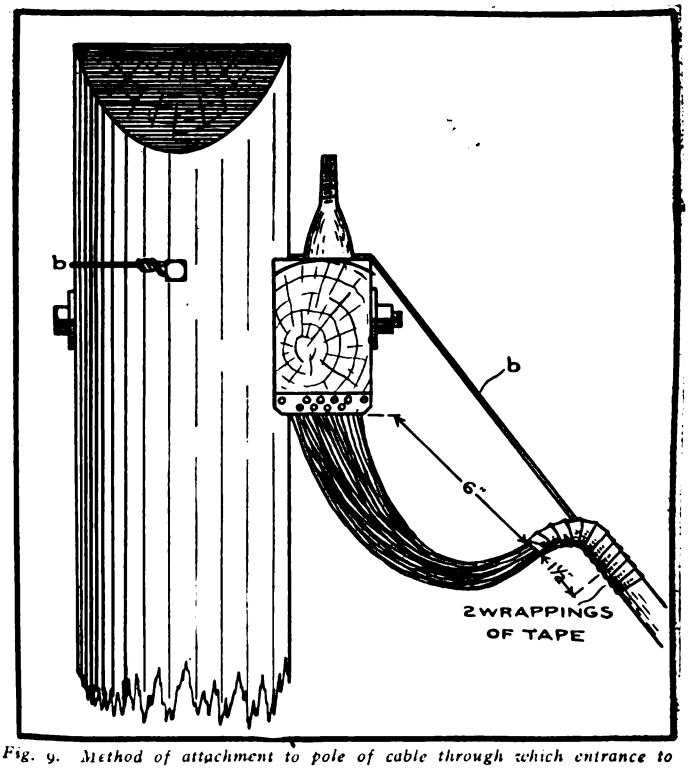

Fig. 9. Method of attachment to pole of cable through which entrance to test station is made.

wire emerges from the cable, the covering must of course be removed; and to guard against the saturation of the cable at this point, it should be covered with two wrappings of waterproof tape to a point well within the building. The cable is bent downward to form a drop loop, as shown, and at the lowest point of the loop a small hole is bored through the tape to allow the escape of whatever water may have entered the cable. The cable is then bent up and secured to the bottom of the beam by means of metal pipe straps. These pipe straps are fastened to the beam by means of drive screws. The method of securing the steel wire to the drive screw is well shown in the figure.

MEETING OF THE FIFTH DISTRICT INDIANA INDEPENDENTS.

THE first meeting after the summer vacation of the Fifth District of the Indiana Independent Telephone Association was held in Marion on the 18th inst. Prominent telephone men in this district and A. C. Lindemuth, of Richmond, president; Theodore Thorward, of South Bend, vice-

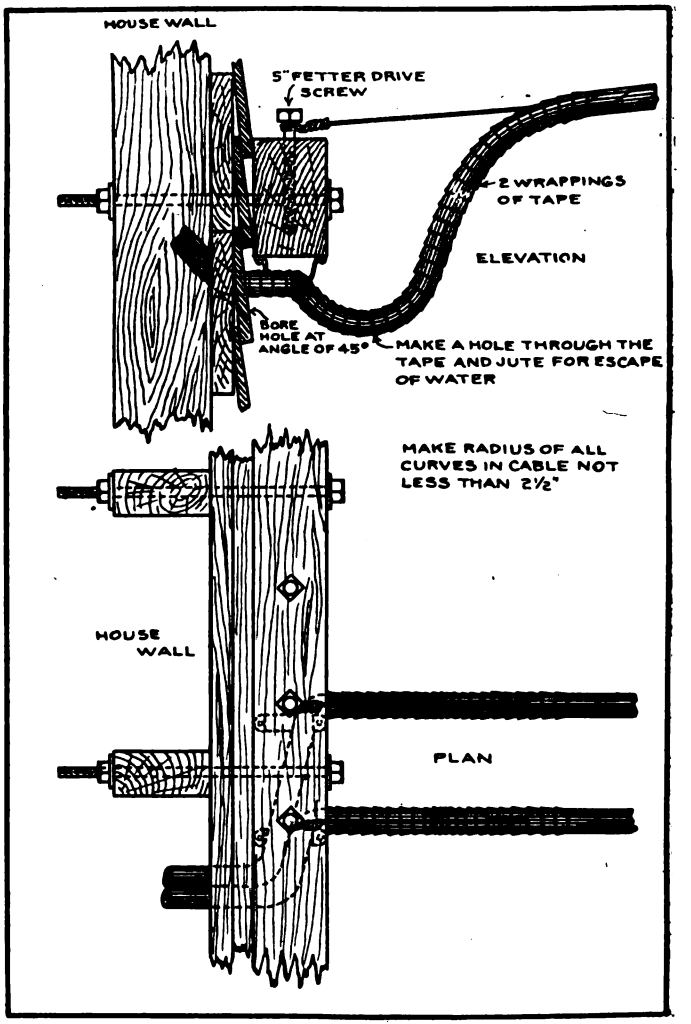
HOUSE WALL
5" FETTER DRIVE SCREW
2 WRAPPINGS OF TAPE
ELEVATION
BORE HOLE AT ANGLE OF 45°
MAKE A HOLE THROUGH THE TAPE AND JUTE FOR ESCAPE OF WATER
MAKE RADIUS OF ALL CURVES IN CABLE NOT LESS THAN 2½"
HOUSE WALL
PLAN

Fig. 11. Method of attaching cable to the wall of the house at test station and making an entrance for the wires.

president, and C. S. Norton, of Indianapolis, secretary of the State Association, were present. A. J. Brown, vice-president for the fifth district, presided. After disposing of routine business, President Lindemuth gave an interesting talk on the "Outlook" in the state, Mr. Lindemuth said conditions could scarcely be better, and that the outlook was encouraging from every view point. Mr. C. S. Norton, secretary, followed Mr. Lindemuth in a five minutes talk and aroused the members to a high pitch of enthusiasm. Mr. Norton said the Independents had made such progress and completed such an amount of substantial improvements and extensions as to become masters of the situation.

INDEX FOR BACK NUMBERS OF THE AMERICAN TELEPHONE JOURNAL.

THE index for Volume 12 of THE AMERICAN TELEPHONE JOURNAL may be obtained on application by subscribers who wish to use it in a bound volume, or as a means of facilitating reference to desired articles in loose copies.

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THE EDITOR'S PAGE

THE DEVELOPMENT OF MULTIPLE-MARKING SYSTEMS.

NOT the least interesting tendency noted in the development of modern operating methods in exchanges equipped with multiple switchboards is the extensive use of conventional signs upon the face of the multiple. Where this plan is carried out to the limits fixed by what is now considered good practice the switchboard presents, it is true, a most varied combination of irregular patterns which to the casual observer are without order or significance. Yet it is to these motley markings that the traffic manager who keenly observes the progress of his work ascribes in a large measure the advances which may be traced in the systematic work of operators which now makes it possible for many more calls per hour to be handled at a switchboard position than was considered possible a few years ago. With this increase in speed has also come a corresponding reduction in the number of errors which is pleasing alike to the officials of the telephone companies and to their subscribers. This has been accomplished by reducing the amount of mental effort necessarily performed in the routine of operating, making successful work more closely and solely dependent upon the skill of eye and hand which is developed by constant repetition of familiar movements.

In so far as the improvement in the reduction of errors is concerned the results obtained have been due to the application of a course of reasoning which is as simple as it is useful in its effects. Briefly stated, its object is to denote any change in the conditions existing on a line by a suitable marking which shall make not only the existence, but the nature of the change evident to the operator at the instant her eye rests upon the jack previous to the ordinary operation of testing to ascertain whether or not it is busy. At its inception this plan was in most cases confined to the designation of disconnections and changes of numbers. For jacks which had been left vacant by the removal of instruments on the connected lines it was only necessary to insert a plug, which would make it impossible to make a connection which must necessarily be an idle and useless one, productive of delay and discontent. If the disconnection should have been followed by the removal of the instrument to a new line the marking of the later number upon the face of the plug furnished a simple means of guiding the operator to the instantaneous establishment of connection with the desired station, and supplied her in a most efficient manner with a means of notifying the calling subscriber of the change in order that false calls might be avoided in the future.

After the success of marking the multiple with plugs had been demonstrated it was but a single step to the use of painted conventions which supply other needed information at the time when it is needed without recourse to the laborious expedient of memorization. It has been found, for instance, that subscribers are prone to call for persons on a party line without giving the proper station number. When all jacks to which are connected lines carrying instruments at more than one station are indicated by a little daub of appropriately colored paint, the receipt of a call for the line number only may be recognized instantly as an error, and a correction obtained, or the person calling referred to the proper source for information, without delay.

Similarly, the development of branch exchanges, with their multiplication of trunks leading to the same destination, has brought about the need of grouping the lines together, and marking the groups to show that they form, for operating purposes, a unit. It would be interesting if it were possible to ascertain how many lost calls and false busy reports are prevented every day by this simple expedient. Other schemes than those referred to have been developed, so that the operator is enabled to redirect many calls which are improperly given. For those in which she detects an error, but is unable to assist its correction herself, or through the immediate co-operation of the subscriber, she is at no loss for a correct course of procedure. The multiple markings have made her aware that the call is one of the class recognized and designated as "inconsistent with the multiple," and as such demanding reference to a person able to give assistance to the subscriber in the most complete and definite form. The concentration of calls for information at a special position or table would be far from an efficient feature of modern operating were it not for the promptness and accuracy with which the services of the information operator, with her various records, may be brought into play through the use of the jack markings. They thus become an important means of avoiding delay on calls which must necessarily contain elements which are vexatious to subscribers, and enable the company to often turn any feeling of discontent which might exist into a sentiment of admiration for the promptness with which it handles affairs of which the complicated nature must be evident even to the uninitiated.

Efficiency in its complete sense of maximum speed accompanying the highest accuracy is in operating as in everything else, the result of close attention to details. The elimination of unnecessary mental effort and especially of effort which must be many times duplicated without producing progress, is one of the easiest and surest steps toward its attainment. It is for this reason that so much care has been expended upon the production of complete systems for line designation, and that the results of employing these systems have been so positive and satisfactory.

THE ENDURING WRONGS.

A SOLICITOR of contracts for a telephone company tells a story of one of his failures which will doubtless recall parallel experiences to many who have become familiar with the peculiar whims of telephone users. Being new to the city in which he was working he approached one of the leading citizens, a man who would undoubtedly have received much benefit from having the service in his house. Firm refusal to give any consideration to the signing of a contract was met. Questioning for a reason brought little satisfaction, but finally in a burst of petulance the information came out that some years before there had been a telephone in the house, that it had been removed, and that no further dealings with the company which had owned the instrument were desired. By this time the solicitor's curiosity was keenly aroused, and he kept at his man until by his tactful efforts he discovered the real reason for the man's discontent. While examining the protectors an inspector had carelessly stood upon a fine mahogany desk and scratched its surface with the nails in the heels of his shoes. That was enough to damn the whole company!

This is one of the instances which shows how closely related are the interests of a telephone company and the personal characteristics of the men who do its work. The telephone inspector is a great deal more than a mechanic who does work upon parts of the wire plant or equipment. When he goes into the home of a subscriber he is the company's representative. All his acts are observed and considered by the subscriber in rounding out his estimate of the character of the corporation which gives him service. Neat appearance and good manners will help a telephone inspector more than the ability to draw out the circuits of every instrument that is on the market.

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QUERIES

USE OF PIGNOLET VOLT-AMMETER (787).

Will you please explain to me the method of using the Pignolet volt ammeter for testing batteries and measuring the resistance of coils?

G. L. W.

The Pignolet volt-ammeter is graduated to various scale readings suitable for telephone work. In our reply to your question we will take, for example, an instrument graduated to give read-

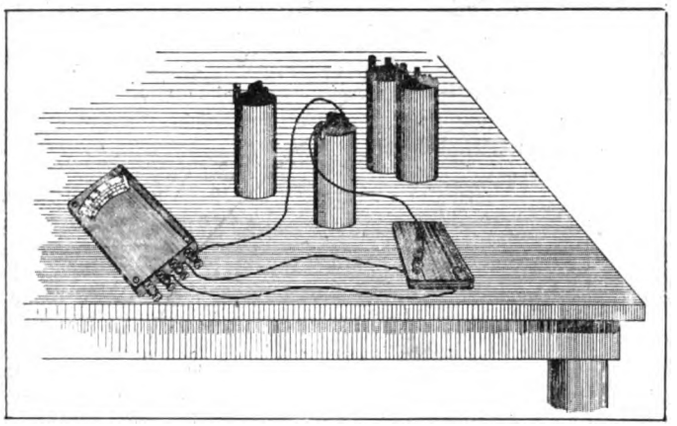

Fig. 787a.

ings from 0 to 5 and from 0 to 100 volts on the low and high voltage scales, respectively; the principles stated will apply equally well to instruments with other graduations.

For testing batteries direct readings only of voltage and current need be taken. It is customary to test dry batteries for both requirements, and, furthermore, to see that they not only give a satisfactory reading on a single test, but that they will continue to give a satisfactory current output during a stipulated number of seconds, in order that one may be sure that they will not run down during an ordinary conversation. The manufacturers of such batteries will state what standard of performance in this respect may be expected, and the purchaser may check his cells by this standard. The voltage of a cell may be checked by connecting its carbon terminal to the terminal marked P on the volt-ammeter, and its negative terminal to the low scale terminal of the volt-ammeter, marked 5. If the voltage is satisfactory the next step is to shift the connection from the voltmeter terminal to the terminal marked A to obtain a current reading. The connection here should be maintained for the desired period of time, and if the needle falls back quickly toward the left of the scale; or

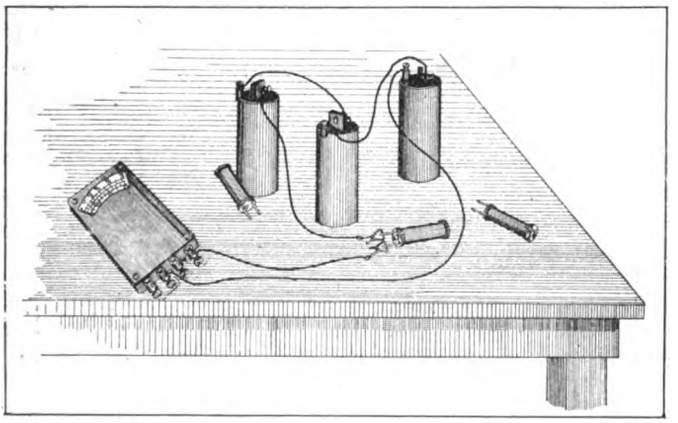

Fig. 787b.

if it does not originally indicate a sufficiently high current (according to the capacity of the cell given by the manufacturers), it is an indication that the cell polarizes too quickly, or has too high an internal resistance. Such a cell should, of course, be rejected. As no other apparatus than the volt-ammeter is needed such tests may be readily conducted on batteries at the subscriber's station as well as upon those at the central office. The connections for this test are indicated in Fig. 787a, in which a small circuit changing switch indicates a convenient method of changing the connection to the ammeter post from the original connection to the voltmeter post 5, useful when many cells are to be tested.

For testing unknown resistances this instrument may be used within a range of from 10 to 2,000 ohms and will give sufficiently accurate results for all ordinary purposes of testing. To measure any resistance it is simply necessary to connect up the voltmeter, unknown resistance and a suitable battery, all in series, using the high-scale voltmeter and a high voltage battery for resistances above 500 ohms, and the low-scale voltmeter winding and a low-voltage battery for all resistances expected to measure less than that figure.

These instruments are so adjusted that each division of the voltmeter scale is equal also to .001 ampere (one mil-ampere), and the voltmeter resistances are as follows: 0 to 5 volts, 100 ohms; 0 to 25 volts, 500 ohms; 0 to 50 volts, 1,000 ohms; 0 to 100 volts, 2,000 ohms.

This permits resistance to be determined by Ohm's Law, that the resistance of a circuit equals the volts divided by the amperes, $(R = \frac{E}{I})$.

To apply this with the instrument, first measure the volts of the battery used for the test, then ascertain the amperes (mil-

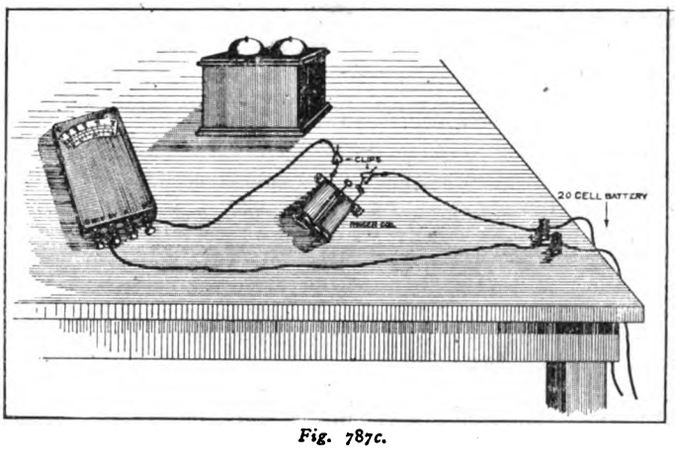

Fig. 787c.

amperes) with the unknown resistance in circuit with the battery and voltmeter. Divide the volts by the amperes (which gives the resistance of the circuit including that of the voltmeter), subtract the resistance of the voltmeter, and the remainder is the unknown resistance.

For example: Suppose the battery to have 4.5 volts, the voltmeter to read 0 to 5 volts and the amperes to be .020 (20 mil-amperes), indicated by a deflection of the pointer of twenty divisions of the voltmeter scale, when the unknown resistance is connected in series with the voltmeter and battery. Then the resistance equals 4.5, divided by .020 less 100 ohms (the resistance of the voltmeter). Answer, 125 ohms. See Fig. 787b.

If the battery had 45 volts and the voltmeter read from 0 to 100 volts and the amperes were .010, as before, when the unknown resistance was connected in series with the voltmeter and battry. Then the resistance would be 45, divided by .010 less 2,000 ohms (the resistance of the voltmeter), which gives 2,500 ohms as answer.

To measure an ordinary 1,000-ohm ringer with a battery of 30 volts (20 dry cells) on a 100-scale instrument, connect them up in series with the 100 scale winding of the instrument, as shown in Fig. 787c.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

PREVENTING NON-SUBSCRIBERS FROM ADVERTISING TELEPHONE NUMBERS.

We find several parties and firms in our territory who are not renting telephones of us nor paying us a cent for the use of the service, who are advertising in papers and on their bill heads the number of some subscriber's telephone as their telephone number. They are usually located in the same building and sometimes in the same room. Have they a legal right to do this? Is there any way to prevent them from using a subscriber's telephone number when they are not paying us a cent for the service? Your opinion on this matter will be greatly appreciated. K. T. C.

WE do not believe that persons who are not subscribers have any right to advertise, as their telephone number, the number of some subscriber's telephone. They may be prevented from doing this by an injunction, which could be obtained from a court of competent jurisdiction upon the filing of a proper bill of complaint. We know of no case in which this has been actually tried, but believe that such a suit would succeed without much question.

ENFORCEMENT OF REGULATIONS NOT IN ORDINANCE.

A certain city of Iowa has passed an ordinance requiring telephone companies to place their wires underground. The Bell company complied with this and have placed wires in their conduits. Under this ordinance, the independent company has ordered conduit and they are on the ground. The city has decided not to let them go underground unless they build and maintain a fire alarm system for the city, which is not in the ordinance, The company has complied with every provision in the ordinance and are held up. What can we do?

The city is evidently acting in a contrary manner. If they first order you to place your wires underground, and then prevent you from complying with their former order, by requiring compliance with the further condition that you shall maintain a fire alarm system for the city, it seems that the latter ordinance would supersede the former and relieve the company from the necessity of placing its wires underground in case it did not choose to furnish the fire alarm system. Without copies of both ordinances it is difficult to actually determine the situation. If the requirement that the company build and maintain a fire alarm system is not in any ordinance, you are under no obligation to comply with it, but should continue to act under the first ordinance passed, and if interfered with may secure an injunction restraining the city from hindering your work.

METHOD OF DETERMINING VALUE OF PROPERTY FOR TAXATION.

THE Nebraska Telephone Company furnished the assessor of Hall County, Nebraska, a schedule of its property for taxation for the year 1904, which contained a list of all its tangible property and its gross receipts for the preceding year in each of the several precincts of the county. The assessor duly listed its property, and valued it and assessed it for taxation, using the schedule furnished him as his basis. The company protested against the assessment on the ground that the valuation of its property was excessive and asked for a reduction. The Board of Equalization overruled the protest and its action was affirmed on appeal to the district court. The telephone company took the case to the Supreme Court, where judgment was affirmed.

The company's principal contention was that the amount of its gross receipts for the preceding year contained in its schedule represented and fixed the value of its franchise for the purpose of taxation, and offered to prove the value of its tangible property, consisting of poles, wire, cable, instruments and office fixtures, on the assumption that it had no franchise nor right to do business in the places where its central offices were located. The court decided that the value of such property appeared from its gross receipts for the year prior to the time of assessment, and its franchise did not furnish the true value of its property for taxation. The proper method of determining the value would be to consider all the items mentioned, taken together, and to treat the corporation as a going concern. Nebraska Tel. Co. v Hall County, 106 N. W. 471.

USE OF LONG DISTANCE LINE REFUSED BECAUSE OF DISPUTED BILL.

AT Hampton, S. D., an attorney has brought suit against the Bell Telephone Company, alleging that on May 23d it refused to allow him to talk over the Bell telephone line until he had paid a bill of $3.10 which was disputed. The amount of damages asked is $4,000. The petition alleges that plaintiff had occasion to call up an attorney of Charles City, and when the operator notified him that his party was at the other end ready to talk he started to step into the booth, when he was presented with a bill and payment demanded. Upon his refusal to pay the bill, which he claims he does not owe, plaintiff was refused the right to use the telephone. The grounds of his suit are that the telephone being a public convenience anyone who has the price should have the right to use it.

EVASION OF CONNECTION CONTRACT ENJOINED.

IN the circuit court at Muncie, Ind., judgment has been rendered for the plaintiffs in the suit of the North Manchester Telephone Company against the Home Telephone Company, of Wabash. The North Manchester company averred that some weeks ago it had entered into a contract with the Wabash company by which there was to be an interchange of toll business between the two, to the exclusion of all other companies., where their own lines reached the parties desired to be communicated with. The North Manchester people claimed that later the Wabash company had an opportunity to make similar arrangements with other companies and that in interchanging its business with them, it disregarded the original contract. The complaint asked for damages and a permanent injunction to prevent the Wabash company from further evading the terms of the contract.

It was not only decreed that the injunction stand during the period of the contract which expires in 1916, but that nominal damages in the sum of $150 be paid.

BROWN AND WHITE TELEPHONE POLES.

IT has been decided in the First Criminal Court of Jersey City, N. J., that every pole in the city must be painted brown six feet from the ground, and white from that point to the top. For every violation of the ordinance covering this matter, there is a penalty of $50. The ordinance was adopted twenty-five years ago, and had been forgotten and never enforced until recently, when former Police Sergeant Findley made a complaint against the New York & New Jersey Telephone Company. A pole was planted in front of his property several years ago, and as it settled it compressed a water pipe and finally shut off the supply in his house. Angered at this, he brought suit, with the result that the pole was moved a few feet, and to obtain further satisfaction made complaint against the company for the violation of this antique ordinance. The company was found guilty but sentence was suspended. Other complaints are threatened.

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IN THE OPERATING FIELD

NEW TOLL LINE TO BE BUILT BETWEEN SIOUX CITY AND DES MOINES.

A LARGE force of men under the direction of Superintendent P. C. Cockerill, of the New State Telephone Company, is now at work upon a new trunk line between Sioux City and Des Moines. The construction crew is thoroughly equipped for rapid work, and is making good progress. The completion of the line will make possible improvements in the speed with which toll connections between these two cities may be handled which will be a great advantage to the large number of subscribers to the Independent systems centering in these two cities.

EXTENSION OF TELEPHONE SERVICE IN THE VICINITY OF EDGELEY, N. D.

NEGOTIATIONS by which the Pomona Valley Telephone Company, of Edgeley, N. D., has acquired the property of the Edgeley Electric Telephone Company, have brought about the amalgamation of the two systems operating in this vicinity, and will result in an improved service. The Pomona Valley Company, which was organized a few months ago with a capital of $60,000, is to erect a building for a new exchange, in which will be installed a 200-line switchboard.

Rural lines extending to various points in the vicinity of Edgeley will be built, making a complete system for the town and surrounding country. The new company expects to secure a large number of additional subscribers as soon as the construction work is completed, as the people of the town and those living on the surrounding farms have expressed a strong desire for improved facilities for communication.

THE MAIN EXCHANGE OF THE HOME TELEPHONE COMPANY OF DETROIT.

PLANNED by architects Stratton & Baldwin, of Detroit, in consultation with Engineer Charles H. Ledlie, of St. Louis, and his representative, Joseph Lillich, the new building for the main exchange of the Home Telephone Company of Detroit, Mich., will have a substantial and pleasing exterior, and be admirably suited for the purposes for which it was designed.

The exterior of the building is to be finished with terra cotta up to the sills of the second story windows and to have granite about the main entrance. The second and third stories will be finished on the outside with a red pressed brick and the entire building will be capped with a heavy ornamental terra cotta cornice. It will cover a ground area of 100 x 105 feet. On the first floor will be the general manager's office and rooms for staff employes in the construction and accounting departments, also a directors' room and a large, well lighted room for the draughting and engineering departments. The vestibule at the public entrance opens into a lobby which will have marble floors and wainscoting, and above this lobby the various business offices will be conveniently arranged. From the centre of the lobby leading to the third story will be a grand staircase of marble, having rubber tiling on treads and landings to secure silence.

Opening from the main hall in the second story are to be several rooms designed for the comfort of the operators. These rooms will be arranged en suite, and consist of a large lounging room, dining-room and kitchen, locker room and toilet room. On the second floor provision has been also made for the long distance operating room, terminal room and battery room.

The third floor is to be entirely given up to the main operating room, which will be over 25 feet in height. The ceiling will be entirely carried by trusses, thus keeping the operating floor space free from posts or columns. The room will be lighted by a clerestory with windows about the four sides and provided with a mechanical fan exhaust system of heating and ventilating.

It was thought best, after careful consideration, to contract for the heating of the building and the furnishing of electric light and power by the local heat and power companies. The construction work on this building will be started this week, and the foundations and steel structure will be ready this winter so that the completion of the building will occur in the spring, making it ready for occupancy about May 15, 1907.

New Building to Be Erected by the Home Telephone Company of Detroit, Mich., for Its Main Exchange and Executive Offices.

VIRGINIA OPERATORS OF INDEPENDENT TELEPHONE SYSTEMS ORGANIZE STATE ASSOCIATION.

THE Virginia State Independent Telephone Association was organized at Richmond on October 11th. Independent companies from all parts of the State, to the number of about thirty, were represented, and this work on their part is looked upon as one of the most important events in the history of Independent telephony in the State. It will undoubtedly be the means of bringing the companies into closer touch with each other, and result in a general betterment of the service in all sections. The association will be affiliated with the International Independent Telephone Association.

The morning session of the meeting was called to order by H. E. Bradley, of Philadelphia, Pa., secretary of the Pennsylvania State Association, acting as representative of the International association, who made a short speech, outlining the objects of the association and

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its policy. Committees on credentials, permanent organization and constitution were appointed, after which the meeting adjourned for lunch.

At the afternoon session the reports of committees were presented and a permanent organization was perfected.

The following officers were elected for the ensuing year:

President, Albert Parlett, Bristol.

First vice-president, F. F. Marbury, Alexandria; second vice-president, W. N. McAnge, Suffolk.

A constitution and by-laws were adopted, and the report of the committee on credentials showed that companies operating over 10,000 telephones throughout the state were represented. A partial list of those at the convention is as follows:

Capital City Telephone Company, F. F. Marbury, Alexandria; Farmers' Mutual Telephone Company, of Albemarle, T. E. Powers; Southern States Telephone Company, G. L. Hadyn, Norfolk; Bristol Telephone Company, Albert Parlett, Bristol; West Halifax Telephone Company, Mr. Ingram; Franklin County Telephone Company, B. L. Fisher, Rocky Mount; Chuckatuck Telephone Company, George W. Watts, Suffolk; Harrisonburg Mutual Telephone Company, W. C. Switzer, Harrisonburg; Nansemond Telephone Company, W. N. McAnge, Suffolk; Rockingham Mutual Telephone Company, W. C. Switzer, Harrisonburg; Floyd County Telephone Company, B. L. Fisher, Floyd Courthouse.

OFFICIAL BULLETIN NUMBER FOUR OF THE INTERNATIONAL INDEPENDENT TELEPHONE ASSOCIATION OF AMERICA.

SECOND SERIES.

CONVENTION PROCEEDINGS.

The Official Report of the Convention Proceedings will be ready for distribution about November 5th. This report contains much that is of interest to all connected with the Independent Telephone Movement. Every official of an Independent company should have one.

PUBLICITY.

Mr. Paul Latzke's articles, which ran as a serial in the Success Magazine, have been published in book form under the title "Fighting an Octopus." We examined a copy of this book and recommend its distribution by the Independent companies among their stockholders and subscribers, bankers, brokers, and the general public. If distributed in this way, it cannot fail to help advance the movement by educating the people regarding the true situation in the telephone world.

INDEPENDENT ORGANIZATION.

The Virginia Independent Telephone Association was organized at Richmond on October 11th, and will affiliate with the International Association. We extend a hearty welcome and best wishes for success to the new organization.

The district meetings in Ohio and Indiana are being well attended. The movement in both States has made a marked advance during the past six months.

COMMITTEE MEETING.

The Executive Committee of this Association met in Chicago on October 10th, and adjourned to meet again on call, without selecting place, in about thirty days.

CHICAGO SITUATION.

A Chicago Syndicate, including representatives of those interested in both the Chicago Tunnel Company, and the present Automatic Company in Chicago, has taken over the Independent Company at South Bend for the avowed purpose of facilitating Independent toll line connections with Chicago. Early and satisfactory connections with that city are promised to the Independent companies.

MAPS.

The map department was organized in September, 1905. After thirteen months of hard work, during which time we have been given the hearty support of the Independent telephone journals, the results, while encouraging, are far short of the possibilities.

We have been able to complete a toll line map for only one State—Ohio. We could easily have finished ten or more had the necessary data been promptly furnished. We will be able to get out a map of Michigan at an early date and have considerable data for sixteen other States, but not enough for any of them to make the publication of their maps probable for some time to come.

Now why cannot we have more hearty co-operation? The maps will be of value to everyone in the Independent field and we believe, if their importance were only realized, there would be no delay on the part of the companies requested to furnish data.

The Ohio map has been of considerable use to many Independent Companies. Those receiving copies have been unanimous in their praise, and numerous requests have been received for similar maps for the other States. The map for Michigan will be prepared along the same line.

What Ohio and Michigan have done, can be done by all. We therefore request all companies who have not responded to our request for data to do so at once, so that we may get out their State maps without further delay. At the same time we wish to thank all who have assisted in this work.

"SHIELD" ADVERTISING.

One of our members suggests that the Independent companies furnish all business and professional men among their subscribers with cuts of the "Shield" for use on their stationery in connection with their Independent telephone number. The idea is a good one and has already been adopted in some sections. We believe many subscribers would be willing to co-operate with the Independent companies in thus helping to advertise the "Shield," and the Supply Department can furnish good cuts in one or two colors at very low prices.

The demand for the Standard toll sign keeps up and quite a number of the new lamp signs have been sold during the past month. We are also glad to notice that more companies are displaying the "Shield" on directory covers and stationery and on special advertising matter, including newspaper work.

Thus the work of educating the public to "Look for the Shield" goes merrily on. It will pay you to take a hand in it.

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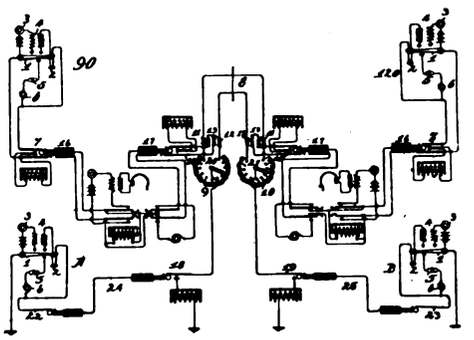
TELEPHONE PATENTS

TELEPHONY.

Harry O. Rugh, Chicago, Ill., patents (No. 12,541; reissued Oct. 9, 1906; original No. 747,491; dated Dec. 22, 1903; application for reissue October 20, 1905; serial No. 283,712) and assigns by mesne assignments to Edward C. Hennis, Sandwich, Ill., telephony.

It is the object of the inventor to provide a system in which four persons may converse simultaneously over a telephone line



consisting of two metallic circuits and a ground connection, without objectionable cross talk. Referring to the figures, two exchanges 9 and 10 are shown connected by the trunk line at 8, connected to each of which is a grounded substation and a metallic circuit substation. In order that the trunk line may be kept perfectly balanced at all times, the grounded lines terminate at rheostat contact arms 20 and 21. The extremities of the resistance coils are connected across the leads of the trunk line as shown. At 13 are repeating coils which prevent the grounding of the metallic subscribers' lines.

TRANSMITTER MUFFLING DEVICE.

William A. Patterson, Pittsburg, Pa., patents (No. 831,889; dated Sept. 25, 1906; filed Oct. 20, 1905; serial No. 283,632) a telephone attachment.

In order that a transmitter may be temporarily rendered inoperative during a conversation, the inventor provides a screen, which consists of a disc provided with an annular flange intended to fit over the end of the mouthpiece. An opening in the disc is provided with a shutter, which is operated by the person using the telephone.

COMBINED TELEPHONE AND ALARM SYSTEM.

Harry G. Webster, Chicago, Ill., patents (No. 825,625; dated July 10, 1906; filed July 11, 1904; serial No. 216,083) combined telephone and alarm system, and assigns to Milo G. Kellogg, Chicago, Ill.

The inventor has improved upon a system previously proposed in which a telephone line circuit is intended to be at all times available for the transmission of an alarm signal, in which the alarm sending and alarm receiving apparatus do not cause any interference with telephonic signaling or conversation, except upon the sending of an alarm signal.

The improvement described in this patent consists of the employment of a simple interrupting device for making and breaking the telephone circuit. This operates in connection with a receiving device, consisting of an electro-magnet adapted to be energized or deenergized by the pulsations set up by the sending mechanism. This electro-magnet acts upon a vibrating armature, which, through being weighted or otherwise, will synchronize with the pulsations of the electro-magnet, and after a sufficient number have been sent will produce an audible signal, or will close the local circuit of an electric signal, such as an annunciator or lamp. Across the subscriber's instrument is bridged an impedance coil having resistances so proportioned that it will allow a normal current to flow sufficient to energize the magnet of the signal actuating relay, but not sufficient in volume to cause the line relay to attract its armature. The making and breaking device is normally retained in a position which allows the circuit to be closed. It is prevented from revolving by a releasing lever, which is under the control of a device actuated by a thermostat. When the mechanism is released the circuit is made and broken according to a code determined by the character of the interrupter, this giving the alarm and indicating the location of the fire.

RECEIVER SUPPORT.

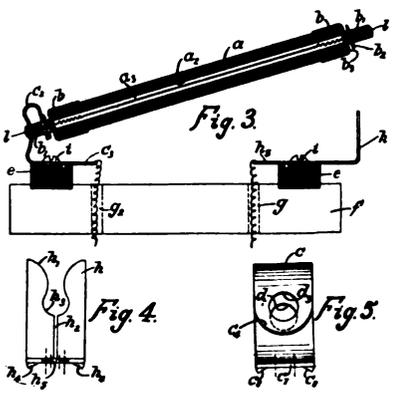
Frank F. Howe, Marietta, Ohio, patents (No. 831,348; dated Sept. 18, 1906; filed March 31, 1906; serial No. 309,217), a telephone-receiver support.

The specification describes a receiver support which is combined with a transmitter support, the two arms being pivoted to a common base. The arrangement of the mechanism in the base is such that when either of the arms is moved the other is moved in the opposite direction. Contact springs are provided which are actuated by an extension at the rear of the transmitter arm.

FUSE.

Frank B. Cook, Chicago, Ill., patents (No. 802,736; dated Oct. 24, 1905; filed July 9, 1904; serial No. 215,942) an electric fuse.

In this invention the inventor describes means for conveniently mounting a fuse and more particularly for mounting the fuse shown in the accompanying illustrations. This fuse was described in patent No. 711,921, dated Oct. 21, 1902. Fig. 3 shows a section of the fuse and its supporting block, Fig. 4 the form of the clip *h*, and Fig. 5 the form of the clip *c* which tends to spring back and throw the opposite end up as shown. To insert a fuse one end



is first put through both openings in clip *c* and the other end is then depressed and forced between the projections *h h*, which spring together and hold the fuse in place. The stress upon the terminals produced through the action of the spring clip *c* insures firm electrical contact and at the same time facilitates the removal of a fuse.

TRANSMITTER ATTACHMENT.

Hahnemann Adolphus Cutmore, London, England, patents (No. 829,849; dated Aug. 28, 1906; filed Sept. 28, 1905; serial No. 280,557) a telephone or like transmitter.

The inventor provides a device which may be attached to the

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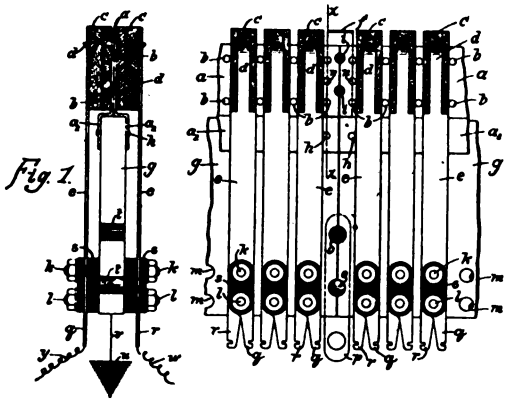
mouthpiece of a transmitter and which, he claims, will so modify the sound waves entering the mouthpiece that they will act upon the diaphragm so as to give better and clearer transmission. It consists of an outer and inner chamber separated by a perforated diaphragm or screen on which is mounted a cone-shaped projection, the apex of which is pointed toward the speaker.

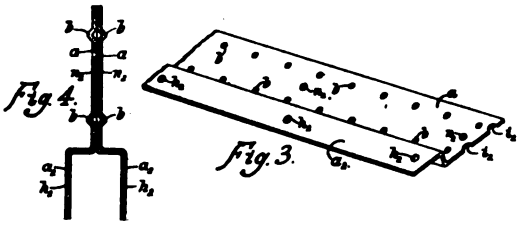
GROUND STRIP FOR PROTECTORS.

Frank B. Cook, Chicago, Ill., patents (No. 802,497; dated Oct. 24, 1905; filed Aug. 5, 1904; serial No. 219,645) a ground strip for protective apparatus.

Fig. 1 is a vertical section and Fig. 2 a side elevation of a



strip of lightning arresters equipped with a ground strip such as is described in the specification. The ground strip, a perspective view of a portion of one half of which is shown in Fig. 3, and a



sectional view in Fig. 4, is composed of two plates *aa* which are riveted together by rivets passing through holes n^2 n^2 and to the ground plate *g* by rivets passing through holes h^2 h^2. A series of projecting points *b* on each side of the strip are formed up of the strip itself and are intended to press against the lightning arresters and prevent lateral displacement. Half-holes i^2 i^2 are adapted to receive bolts *i i*, which hold the ground strips together and which also secure the number plate *f* in position.

INSULATOR.

Monroe J. Glick, Westfield, Ill., patents (No. 831,338; dated Sept. 18, 1906; filed Oct. 2, 1905; serial No. 281,033) and assigns to Jackson Rardin and Timothy Rardin, Westfield, Ill., an insulator.

The inventor provides for an insulator which is intended to hold a line wire without the use of any tie wire. The line wire is first introduced into a horizontal slot near the top of the insulator and then drops down through a vertical slot until it reaches the level of a second horizontal slot. This lower slot is not tubular, but of considerable width. One of the sides is flat, while the other projects inwardly from each circumference toward the vertical axis of the insulator. When the insulator is revolved on its pivot the line wire is held beneath the portion of the insulator which separates the two horizontal slots.

TELEPHONE EXCHANGE.

Nils Emel Norstrom, Chicago, Ill., patents (No. 829,419; dated August 28th, 1906; filed May 31, 1900; serial No. 18,519. Divided and this application filed November 14th, 1903; serial No. 181,133) telephone exchange, and assigns, by direct and mesne assignments, one half to John Anderson, of Salina, Kans., and one-sixth to Globe Automatic Telephone Company, of Chicago, Ill.

The present application is a revision of the inventor's pending application serial No. 18,519, filed May 31st, 1900, and relates more particularly to a calling mechanism by which a required station is selected in a certain type of automatic telephone exchanges. The inventor describes an arrangement of parts at the subscriber's station which enables him to set an index or keyboard at any required selection. After the apparatus has been properly set the selection is accomplished automatically by the mere turning of a crank by the subscriber. Means are provided for indicating whether the fault lies with the subscriber or the exchange apparatus when improper selection is made after the keyboard or index has been set.

MICROTELEPHONE.

Carl Ernst Ljungman, Robert Otto Percival Berglund and Walter Axel Wilhelm Emanuel Hjorth, Stockholm, Sweden, patent (No. 832,135; dated Oct. 2, 1906; filed Feb. 14, 1906; serial No. 301,025) a combined telephone receiver and transmitter.

In order to prevent the singing receiver which is placed back to back with a transmitter in the same case, the inventors mount between them in the case a diaphragm which is not a plane surface, but curved, preferably in a parabolical shape.

RECEIVER SWITCH.

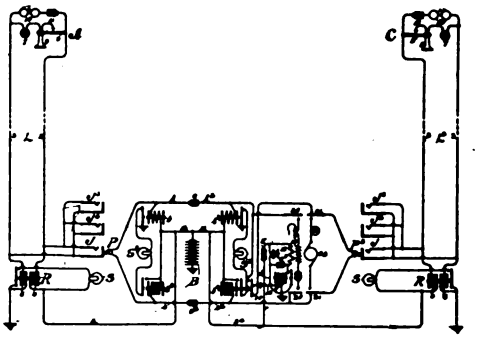
Homer Erastus Smith, Norwich, N. Y., patents (No. 827,576; dated July 31, 1906; filed Oct. 17, 1905; serial No. 283,196) a telephone attachment.

In place of the usual hook switch, the inventor provides a switching device which is operated automatically as soon as the user of the telephone lets go of the receiver. The receiver cord is wound on a drum mounted on the front of the telephone and this drum is provided with a spiral spring which causes it to wind up the cord and draw the receiver up until it engages with the switch arm. It is thus provided that when the receiver is released at the end of the conversation a switch corresponding to the ordinary hook switch is actuated through the action of a spring which is under tension during the time the receiver is in use.

TELEPHONE SYSTEM.

William W. Dean, Chicago, Ill., patents (No. 832,121; dated Oct. 2, 1906; filed Dec. 23, 1902; serial No. 136,332) and assigns to Kellogg Switchboard & Supply Co., Chicago, Ill., a telephone system.

A special differential relay is used instead of the usual line and cut-off relays. The operation of this relay, which is shown at *R*, is as follows: When the subscriber *A* removes his receiver from the hook the current flows from battery *B* through conductor 5, winding 4, the subscriber's line and then through winding 6 to the ground. Winding 4 has more turns than winding 6 and the relay is unbalanced and the line signal *S* displayed. When the operator plugs the key a shunt is formed through the supervisory



relays *R* and R^2, and the action of the current flowing through winding 4 under these conditions balances the relay *R* and causes its armature to fall back, thus extinguishing the line signal. At the termination of the conversation the return of the receiver to the hooks opens the line-circuits, thereby de-energizing the tip supervisory relays and permitting the supervisory-lamp circuits to be closed. If a line is busy the test-rings are raised to the potential of the battery *B* and the testing relay r^3 closes a circuit through the primary of the operator's induction coil, causing a click.

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Gray Pay Stations Pay

There is more trouble in ONE of the so-called pay stations composed of Levers, Springs and other movable parts than can be found in

1000 Gray Automatics

It is proven every day. No Levers to test your strength.

GRAY TEL. PAY STA. CO. HARTFORD, CONN.

50 STYLES

FOR SALE

For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE—Telephone plant near Los Angeles, California, in good condition. One hundred and seventy-five (175) subscribers. Price $25,000. Additional business can be had at little expense. Investigate. Address Downey Home Telephone Co., Downey, Los Angeles Co., California. 706

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

WANTED—Whirlwind salesmen. Men who are resourceful, energetic and capable of commanding large salaries; the kind of men who are not accustomed to take "No" or "We will give you an order the next time you are here" for an answer. For such men we have good positions. We are willing that our salesmen should participate in the profit outside of the question of salary. Apply by letter or in person. Address S. A. Duvall, superintendent Long Distance Telephone Mfg. Co., South Bend, Indiana. 694

THE Dean Electric Company, Elyria, Ohio, is constantly increasing its works, and always on the lookout for first-class young men, experienced in either factory or outside installation work. Make application by letter, stating age, experience, etc. Address Supt., The Dean Electric Company, Elyria, Ohio. 699

WANTED—Man to represent us in the State of West Virginia and surrounding states. One who is thoroughly acquainted with the Independent telephone movement in the state of West Virginia. Would prefer a man who has some knowledge of the telephone business and has influential friends throughout the state. Apply by letter or in person. Address, S. A. Duvall, superintendent, Long Distance Telephone Mfg. Co., South Bend, Indiana. 695

WANTED—A telephone manufacturing superintendent wanted to take charge of tool and manufacturing departments of plant producing high grade telephone apparatus. A thoroughly capable man is required. Address Box 700, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 700

WANTED—Position as salesman handling telephone specialties, wire or cable preferred, by man with several years' experience in telephone field. Age 35; technical graduate. References. Address Box 702, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 702

WANTED—Electrician and construction man, competent to install interior telephones in New York and vicinity. References. Address Box 708, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 708

WANTED—High grade switchboard man in well established telephone factory one hundred miles from Chicago. Preferential employment if qualified. State age, experience and wages required. Address Box 705, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 705

WANTED—Position by man and wife to take charge of telephone system. Man, technical education, seven years' practical experience in construction and management of local or common battery plants. Wife, five years' practical experience in operating and accounting. At present man employed as manager, wife as chief operator and accountant. Desire healthful location in Northwest States. Address Box 707, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 707

The Debutante.

POWER! THE WAY THEY "DO THINGS" IN THIS TWENTIETH CENTURY

That's why we put LEVERS and SPRINGS in

Baird Sheet-Steel Cash Register Pay-Stations

¶ They're not complicated; they don't get out of order, and they do their work perfectly. Remember *Power* is essential to clear and unmistakable signals.

Have you Bulletins Nos. 86 and 51. They're Free

BAIRD MANUFACTURING CO.

1506 BRIAR PLACE, CHICAGO

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

APPARATUS FOR INTERCOMMUNICATING SYSTEMS.

IN designing its intercommunicating systems and apparatus for use in connection with them, the Stromberg-Carlson Telephone Manufacturing Company, of Rochester, N. Y., has borne in mind the fact that such an instrument should in an unusual degree embody the qualities of durability and simplicity, and reliability of construction, and that it should be easily operated and maintained. The manner in which these qualities have been secured in practical form in the instruments which are put upon the market is made very clear by the accompanying illustration (Fig. 1) of one of the standard types of instruments used in systems of this class. The apparatus is equipped with jacks for connection to the various lines composing the system, and the connection with the transmitting and ringing circuits is made by means of a plug connected to a cord which is carried through an opening in the base of the containing box.

The style of wood in which this set is made up is either quarter sawed oak, finished in golden oak, or walnut. The design and arrangement of all the parts makes them easily accessible whenever adjustment or repairs may be necessary. The hook switch, ringer, jacks and induction coil are all constructed with great care, and of the best material, and every effort has been made to produce an instrument which will give the most satisfactory service and reduce maintenance charges to the minimum.

In all intercommunicating systems the use of a high grade cable is most essential, on account of the troubles which may so readily be produced by poor insulation. The Stromberg-Carlson Company has developed a special type of cable for use in systems of this sort. It is made up, as indicated in Fig. 2, with line wires of No. 20 B. & S. gauge tinned copper wire, each conductor being insulated with two silk wrappings and one of cotton. In making it up a color scheme which enables not only separate wires, but individual wires of a pair, to be distinguished is employed. The pairs are formed into a cable, either round or flat, with a binding of five strands of No. 22 ply cotton thread, having two turns to the inch. The group of wires thus held together is then covered with a wrapping of manilla paper, and outside of this is laid a heavy braid saturated with a lead paint. The high grade of insulation employed, and the manner in which the cable is formed up of twisted pairs laid together and given a spiral twist, is said to prevent any cross talk between lines when in use. The company has issued a bulletin giving full information concerning the apparatus and circuits used in connection with intercommunicating systems employing apparatus of this and other types, which it will be pleased to send to interested persons.

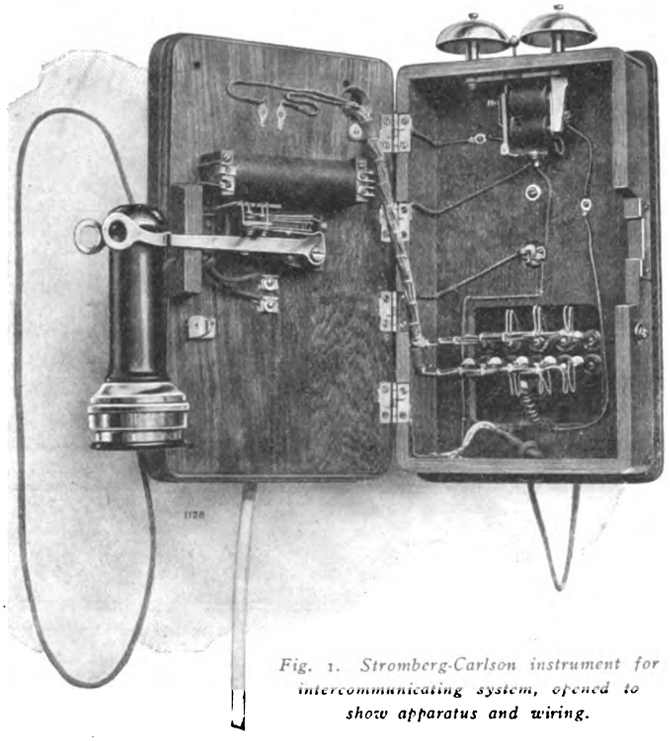

Fig. 1. Stromberg-Carlson instrument for intercommunicating system, opened to show apparatus and wiring.

THE CARBOLINEUM WOOD PRESERVING COMPANY, Milwaukee, Wis., has recently received from the Brier Hill Iron and Coal Company, of Youngstown, Ohio, a very strong letter commending its preparation, Avenarius Carbolineum, for the preservation of wood. The letter reads as follows: "Six years ago in the rebuilding of one of our trestles we coated half the work with Carbonlineum in order to demonstrate its advantages. The timbers that were coated at this time are in as good condition to-day as the day they were put in. Those that were not coated were found this spring to be rotten and unsafe and were replaced with new timber. We performed this same experiment in similar work four years ago with practically the same result. The timber that was not coated at that time shows considerable rot, while the other is as good as new. Three years ago we decided to use Carbolineum on all new work and we think we will be amply repaid." The use of this preparation is also giving very good results on telephone poles, and the ease with which it may be applied, it being simply necessary to go over the surface of the wood with a brush, makes it an especially economical and satisfactory compound to use. The company will send full information to interested persons.

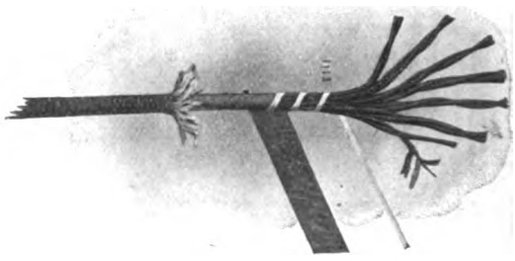

Fig. 2. Section of cable made for Stromberg-Carlson intercommunicating systems.

THE GENERAL STORAGE BATTERY COMPANY, with offices at 42 Broadway, New York City, N. Y., has increased its business to such an extent that it has been obliged to enlarge its present works at Boonton, N. J. Additional generating units are being installed, and the additional switchboard equipment consists of twenty-one generator and feeder panels. The new building which is being added will be a structure of five stories and basement for which a separate power station will be erected.

THE EDWARDS-HINE COMPANY, 5 and 7 Pearl street, Grand Rapids, Mich., reports the possibility that it will within a short time remove its plant from its present location to either the town of Holland or Allegan. This company started only about two years and a half ago as general printers, book binders and lithographers. The success of the company in supplying special systems of accounting and records for telephone companies, in connection with the large growth of the business of the Independent telephone companies throughout the country, has brought about the necessity of enlarging its plant. The capacity of the equipment will be practically doubled.

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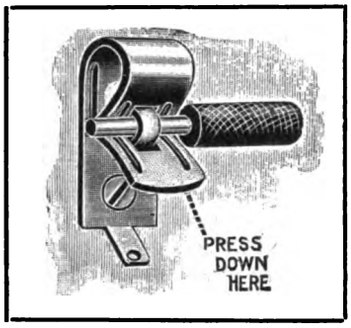
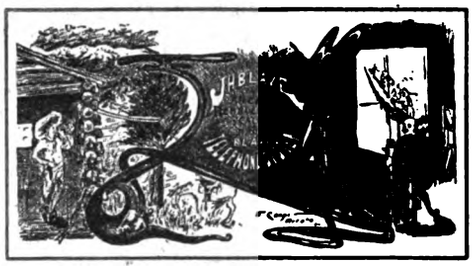
THOROLY USEFUL THRUOUT THE EXCHANGE. ¶ Tho you may never have tried The Fahnestock Spring Binding Post, it has a fixt place as the best wherever a binding post is used. ¶ Altho you have never ordered your dealer to supply you with dry batteries fitted with this post, he will do it without extra charge. ¶ Insist on getting them; they are more than worth the trouble. ¶ Sample Post and catalog—FREE.



FAHNESTOCK ELECTRIC CO.
129 Patchen Avenue Brooklyn, N. Y.

"Neatest Thing I Ever Saw"



Arcata, Cal., July 6, 1906.

The Trumbull Elect. Mfg. Co.,
Plainville, Conn.

Gentlemen:

Your bill for switches came to hand today but the switches came several days ago, and am pleased to say that they were very satisfactory indeed.

I immediately put them on to a switch board of my own design, and it is about the neatest thing I ever saw for a small place.

It is so simple and easy to operate that a child can learn in five minutes to work it.

Thank you for your promptness. You will hear from me again.

Yours very truly,

Dist. J.M.B.
M.

Check enclosed.

The man who wrote this letter made a small switch-board from

Trumbull Switches.

You can save money. Write for directions and prices.

TRUMBULL ELECTRIC MFG. CO.
618 Woodford Avenue, Plainville, Conn.

Inter-Ocean Telephone & Telegraph Co.
332 ELLICOTT STREET.
Buffalo, N. Y.

March 22, 1906.

American Telephone Journal,
16 Nassau St.,
New York, N. Y.

Dear Sirs:-

We thought it might be of interest to you to know that the notice you gave our "Independent Talks" published some-time ago in your books, has apparently received wide-spread notice.

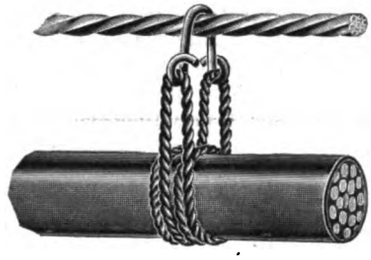
Letters are coming to us from all parts of the United States for copies, and at the same time mentioning the fact that they saw the display Ad in the American Telephone Journal, which goes to show that as an advertising Journal, your Paper has undoubtedly a large acquaintance.

We would further add that we have received an inquiry from St. Catherine, Quebec , also from most all of the Western Independent Telephone Companies: we might mention in paticular the Oregon & Forest City Telephone Co., Oregon, Mont.

For your information.

Yours truly,
Inter-Ocean Tel. & Tel, Co.
Toll Dept.
D.

"National" Cable Hangers



Patent applied for

SIMPLE **DURABLE**

Cannot become detached from the messenger strand.

Hook will not straighten out.

Wires cannot be caught under the hook when being strung above the cable. We use the best grade of marline and houseline in the manufacture of our hangers. Write your jobber to-day for prices and samples.

National Telephone Supply Company
MANUFACTURERS
3923 Superior Avenue Cleveland, Ohio

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IN THE MANUFACTURING FIELD

TALK-THROUGH REPEATING COILS AND MAGNETO SWITCHBOARD DETAILS.

IN the way of cabinet design very excellent features have been embodied in the magneto switchboards which have been recently put upon the market by the Automatic Electric Company, of Chicago, Ill. The intention of the company has been to produce a switchboard which shall be at the same time substantial in construction and pleasing in appearance. The exteriors are made of the best grade of seasoned quarter sawed oak. Great care is exercised in paneling and joining the corners, in order to make a substantial structure, which will not fall to pieces even though subjected to the roughest handling during shipment and while being moved about previous to installing. The cabinets are finished with the best material, in either light or golden oak. The last coat of varnish is hand rubbed, and will retain its polish for a very long time. The accompanying illustration, Fig. 2, shows the details of the paneling and joining work at the corners, which will give an idea of the methods which have been adopted to secure a neat and durable form of construction.

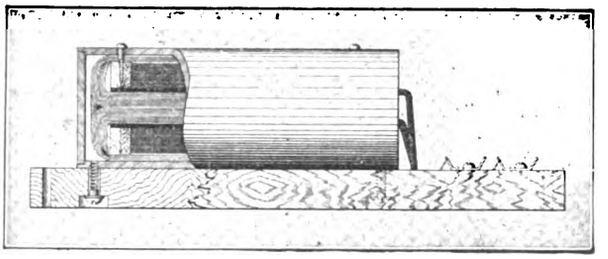

Fig. 1. Repeating coil for use on toll lines.

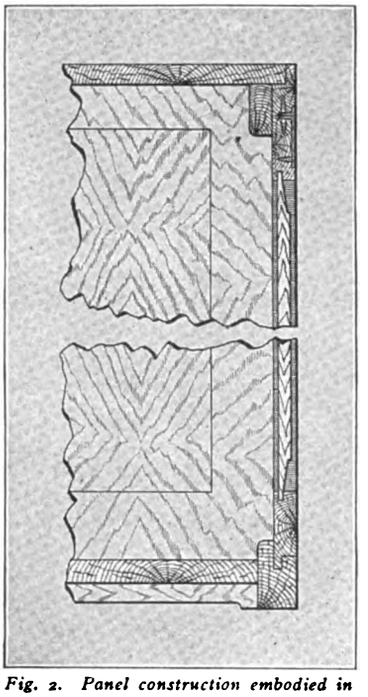

Fig. 2. Panel construction embodied in magneto switchboard cabinets by the Automatic Electric Co.

Repeating coils form an interesting and important part of an exchange equipment where grounded lines are used, or where they are cut into toll line connections to localize disturbances from noisy lines. The company has devoted considerable care to the designing of these coils, and manufactures two types for use with its magneto boards. The talk-through repeating coil illustrated in Fig. 1 is designed especially for transmitting voice currents regardless of signalling, and is therefore adapted especially to the conditions prevailing in toll line work. This coil is not so often used upon magneto boards as the other type, and is not capable of transmitting ringing currents.

In Fig. 3 is shown a cross section of a repeating coil used both as a ringing and talk-through coil. This apparatus is designed to have the best efficiency for both purposes, and is recommended for general use. Both of these types of repeating coils are enclosed in iron shells to prevent cross talk from adjoining coils and other apparatus. Many other details of equipment and construction embodied in the new switchboards are contained in the company's recently issued catalogue, which is issued in sections devoted to various kinds and types of apparatus, both manual and automatic. These catalogues, which are attractive in appearance, may be obtained by interested persons on writing to the company.

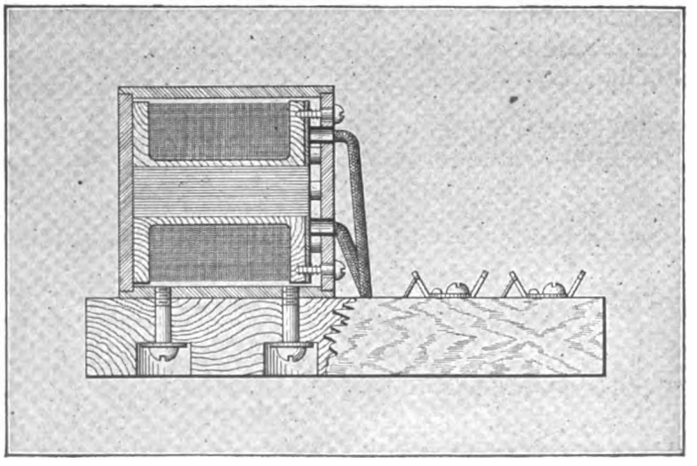

Fig. 3. Repeating coil for efficient transmission of both ringing and talking currents.

DEVICE FOR TESTING AND RESETTING SELF-SOLDERING HEAT COILS.

FRANK B. COOK, 238 West Lake street, Chicago, Ill., is sending out a circular describing his new "Automatic Electrical Testing and Resetting Plug." The circular states that all self-soldering heat coils have proved unsatisfactory in one particular, namely, that they sometimes burn out and are reset in the circuit when they are not in condition to give protection to the apparatus of the system. Very large currents passing through the heat coils, will sometimes overheat and short circuit them by charring the insulation on the winding or by fusing together, or bringing into contact with each other, certain parts of the heat coil. Such a short circuited heat coil may be replaced in the circuit which it is to protect, but it will not heat sufficiently to operate. Mr. Cook states that there has been brought to his attention an instance where are many as 40 out of 1,000 self-soldering heat coils were short circuited at one time, and were unfit to be used in the lines, and that this was in a large exchange where skilled attendants were on duty duty to look after the protectors.

In the ordinary test of a telephone line, there is nothing to indicate that the heat coil is short circuited as the circuit is completed and the line seems to test O. K. Therefore, in order to give proper protection to the apparatus of a system, Mr. Cook says it is very essential to have some means of determining whether a heat coil is short circuited or not—hence the need of the testing and resetting plug. Mr. Cook believes that some such scheme should be used in connection with all self-soldering protectors, to insure proper protection of the system. He will be very glad to send his circular describing the new "Automatic Electrical Testing and Resetting Plug" to exchange managers who have installed self-soldering protective apparatus.

THE VOTE-BERGER COMPANY, La Crosse, Wis., is meeting with much success with its new wire ballast common battery switchboard. It has recently issued in the form of a folder a description of this switchboard for private branch exchanges and small systems. By the use of a line-wire ballast in the line circuit the necessity for a relay is obviated. The resistance of the line-wire ballast increases with the current which is sent through it, insuring a constant potential across the lamp terminals. One of the advantages claimed for the common battery switchboard using the ballast is that of low initial cost. Catalogue will be sent on request.

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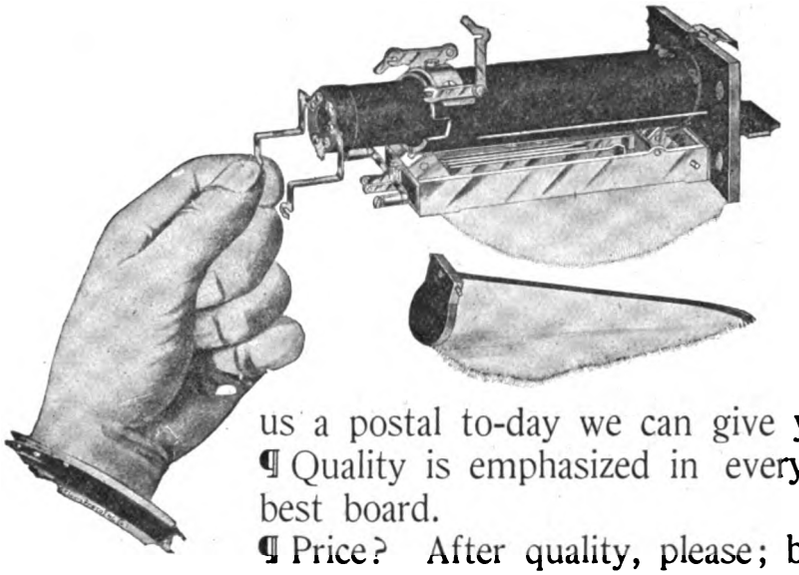
We Do Not Want Your Switchboard Order



¶ If we cannot prove absolutely that our "New Primo" Drop is better than any other you can buy, without regard to price, prestige or any other consideration.

¶ "Hot Air"—not at all, if you drop us a postal to-day we can give you reasons.

¶ Quality is emphasized in every individual part of this latest and best board.

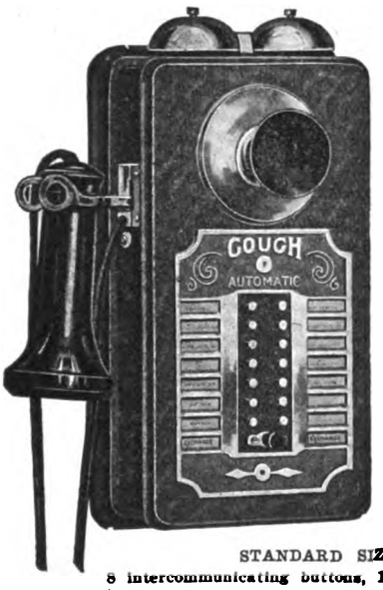
¶ Price? After quality, please; but yours for the asking.

CENTRAL TELEPHONE & ELECTRIC CO.

MAKERS OF HIGH-GRADE TELEPHONE APPARATUS

2131-2133-2135-2137 Lucas Avenue **ST. LOUIS, U. S. A.**

One Extra Button



down at the bottom of the front plate enables you to connect your instrument direct to the city exchange. The other buttons are for intercommunicating service. The city exchange can also call up any station on your system.

Automatic reset—the station is left in condition to be called after using.

Trunk Button

Send for Catalogues

STANDARD SIZES:

8	intercommunicating buttons,	1	exchange	button
14	"	"	1	"	"
18	"	"	1	"	"
24	"	"	1	"	"
28	"	"	1	"	"

100% CHEAPER THAN BRANCH EXCHANGE.
100% QUICKER; 100% MORE SATISFACTORY.

S. H. COUCH CO., Inc., Manufacturers
162 PEARL STREET, BOSTON, MASS.

IT MEASURES THE TIME OF THE TOLL CALL

The Calculagraph

prints the elapsed time of each call on the toll ticket as well as the time of day. No overtime charge is overlooked. It makes no clerical errors.

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NEW COMPANIES.

DEL NORTE, COLO.—Plans for the organization of the Farmers' Union Telephone Company are now under way at Del Norte.

ROCK ISLAND, ILL.—The Simpson Mutual Telephone Company, of Rock Island, Ill., has been incorporated with a capital stock of $5,000. The incorporators are John R. Harper, Milo Austin and N. A. Martin.

ST. JACOB, ILL.—The Home Telephone Company, of St. Jacob, Ill., has been incorporated with a capital stock of $5,000. The incorporators of the new company are Chris Busse, Frank Virgin and John L. Noll.

SULLIVAN, ILL.—A new Independent telephone company, to be known as the Diamond Mutual Telephone Company, has been organized at Sullivan. The following officers and directors have been named: President, William Sherburn; secretary, J. F. Fleming; directors, Irving Shuman, J. R. Bean, James LeGrand, William Sherburn, L. C. Horn and J. F. Fleming.

ALGONA, IOWA.—Articles of incorporation have been filed by the Algona Telephone Company, of Algona, Iowa. The company's authorized capital is $50,000, of which $12,000 worth of stock has been sold. The following officers and directors have been named: President, W. C. Dewel, vice-president, F. W. Dingley; general manager, B. H. Gardner; treasurer, H. E. Rist; secretary, L. J. Dickinson; directors, W. K. Ferguson, H. E. Rist, C. F. Lathrop, L. J. Dickinson, B. H. Gardner, F. W. Dingley, E. E. Conner and W. C. Dewel.

PROTECTION, KAS.—An Independent telephone company has been organized at Protection, and will install an exchange at that place.

MINTONVILLE, KY.—The Mintonville Telephone Company has been incorporated by Tuker Jasper and others.

EASTPORT, ME.—Among those interested in the formation of an Independent telephone company at Eastport, Me., are William Saddler, William Morton, S. A. Hayward, J. W. Howe and Freeman Frost.

CASS CITY, MICH.—A movement is now on foot to organize a co-operative telephone company for Cass City. Articles of incorporation are now being prepared under the name of the Cass City Telephone Company. It is the intention of the new company to form connections with the Saginaw Telephone Company, and to also co-operate with the farmers in the surrounding country in the matter of building farmers' lines.

LIVINGSTON, MONTANA.—Articles of incorporation have been filed by the Livingston Home Telephone Company, with the following incorporators: J. S. Haley, A. Livingston, J. M. Seaman, R. D. Alton. It is the intention of the new company to install a modern and up-to-date plant with a capacity of one thousand telephones. The work of construction will be under the supervision of J. S. Haley.

NEW YORK, N. Y.—The Corporation Trust Company, 135 Broadway, New York, reports the following new corporation: The Zanzibar Telephone Company, with a capital stock of $5,000, to establish a telephone system in East Africa. The incorporators are J. A. Jones, W. D. Despard, F. W. Vining, all of New York City.

ASHEVILLE, N. C.—The Union National Telephone Association, with its principal office in Asheville, has been incorporated. The company has an authorized capital stock of $380, with the privilege to increase to $5,000, and expects to do a general telephone business in the counties of Western North Carolina. The incorporators are: A. I. Judy, C. A. Holcombe, H. R. Judy and W. O. Holcombe, of Asheville, and C. H. Washburn, of Goodhope, West Va.

NEW WESTON, O.—Articles of incorporation have been filed by the New Weston & Rossbury Telephone Company, of New Weston, O. The capital stock of the company is placed at $20,000, and the incorporators are W. W. Busby, Charles Medford, Charles Haher, E. C. Richardson and J. A. Ainsworth.

WARREN, PA.—The Kinzua & Corydon Telephone Company, of Warren, Pa., has been incorporated with a capital stock of $10,000.

BURKEVILLE, TEX.—The Western Union Telephone Company, of Burkeville, Newton County, Texas, has been incorporated with a capital stock of $20,000. It is the intention of the company to construct telephone lines in several counties in Eastern Texas. The incorporators are E. F. Montgomery, J. C. Ramsey, J. S. McWhorter, E. A. Griggs and others.

HAZEL GREEN, W. VA.—The Progressive Telephone Company, of Hazel Green, W. Va., has been incorporated. It is capitalized at $10,000.

HIGHLAND, WIS.—The Council Bluffs Telephone Company, of Highland, Iowa County, Wis., has been incorporated with a capital stock of $450. The incorporators are Anthony Johnson, Frank Olson and Arthur Anderson.

MANITOWOC, WIS.—Articles of incorporation have been filed by the Newton-Manitowoc Telephone Company. Its capital stock is placed at $2,000, and the incorporators are Henry Tendick, Ernst Rodewald, and John Grossuesch, the former of Manitowoc and the two latter of Newton. It is the intention of the company to construct a line from Manitowoc to Cleveland via Newton.

SUMNER, WIS.—The Beef River Valley Telephone Company, Sumner, Trempealeau County, Wis., has been incorporated with a capital stock of $2,000. The incorporators are John Ring, M. C. Johnson and others.

EVANSTON, WYO.—An Independent telephone company has been organized at Evanston to construct a line from Kemmerer to Big Piney. It is estimated that the projected line will cost in the neighborhood of $5,000.

FRANCHISES.

SAN FRANCISCO, CAL.—The Home Telephone Company has been granted a franchise to construct, maintain and operate a telephone system in San Francisco, the Board of Supervisors passing the ordinance by an affirmative vote of ten. This is a confirmation of the original grant, the legality of which was questioned.

GLENWOOD SPRINGS, COLO.—Application has been made by the Garfield County Telephone Company for a franchise at Glenwood Springs.

STAMFORD, CONN.—Application for a charter to establish a telephone system in Stamford, Conn., will probably be made by the State Line Telephone Company.

BOISE, IDAHO.—The New Century Improvement & Extension Company has applied for permission to construct a private telephone line along the Queens River to give connection with the Mammoth Rico mine.

CARLYLE, ILL.—The People's Home Telephone Company has applied for a charter to establish an Independent telephone system in Carlyle.

SAPULPA, I. T.—A franchise to install a telephone system at Sapulpa has been applied for by S. H. Bevins.

JOPLIN, MO.—Application for a franchise at Joplin has been made by the Home Telephone Company. The Home company offers to place its downtown wires underground and make other improvements in its system if a franchise such as it is asking for is granted.

WINNIPEG, MANITOBA, CANADA.—Application has been made to the city council by B. Allen, of Stratford, Ont., for a telephone franchise to extend over a period of fifty years. Mr. Allen is backed by capitalists who are willing to advance $20,000,000 if necessary to promote the scheme. The council favors the proposition and will call a special meeting to go fully into the matter. Alderman Pulford can give full particulars.

FINANCIAL.

KIRKLAND, ILL.—The Farmers' Union Telephone Company, of Kirkland, has increased its capital stock from $2,500 to $5,000.

GRAND RAPIDS, MICH.—A 2 per cent. quarterly dividend, payable October 20th, has been declared by the Citizens' Telephone Company. This is the company's thirty-seventh consecutive quarterly dividend.

PRAIRIE HOME, MO.—The Farmers' Telephone Company, of Prairie Home, has increased its capital stock from $3,000 to $5,000.

CLEVELAND, O.—The Cuyahoga Telephone Company has declared a 1 per cent. quarterly dividend on its common stock, payable October 20th to stock of date of October 5th. A quarterly dividend of 1½ per cent. on the preferred stock, payable November 1st, to stock of record of October 20th, has also been declared. The dividend on the preferred has previously been semi-annually, but from now on it will be quarterly, payable about thirty days after the end of each quarter.

NEWS—WANTED

THE matter contained upon the message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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THE WEEK'S MESSAGES

ERIE, PA.—The stockholders of the Mutual Telephone Company have voted to increase the capital stock of the company from $150,000 to $500,000. The object of the company is not to sell all of the stock immediately, but to dispose of such as is necessary to meet requirements from time to time. About $50,000 will be disposed of this year. The immediate needs of the Mutual Company include an extension to the building now in course of construction, new cable and a new switchboard. The improvements contemplated have been made necessary by the company's greatly increased business.

COMBINATIONS.

SCOTTSBORO, ALA.—The local Independent telephone system, formerly owned by W. R. Moody, has been purchased by prominent citizens of Scottsboro. An Independent company is to be incorporated with a capital stock of $25,000, which will at once improve the system and extend its lines. There are already over one hundred miles of wires in operation, and the company proposes to put in a new copper circuit, and extend a line from Decatur to Chattanooga. The following officers have been elected: James O. Lipscomb, president; J. W. Gad, secretary; L. W. Roser, treasurer; D. E. Barclay, manager; J. F. Proctor, attorney.

EDGELEY, N. D.—Negotiations have been completed by which the Pomona Valley Telephone Company, recently organized with a capital stock of $50,000, has acquired the properties of the Edgeley Electric Telephone Company. It is the intention of the Pomona Company to erect an exchange building and install therein a 200-drop switchboard. In addition about 35 miles of rural lines will be constructed.

BEND, OREGON.—The Deschutes Telephone Company has purchased the telephone line between Prineville and O'Neil, formerly built and owned by the O'Neil brothers. This will give Bend direct service to O'Neil, and many rural lines will be connected to the system. It is the intention of the Deschutes company to extend its lines in all directions, building up a large rural system.

CORYDON, PA.—The headquarters of the Kinzue & Corydon Telephone Company, recently incorporated at Warren, are at Corydon, Pa. The company is chartered for $10,000, of which $3,500 has been paid in. Connections will be made with the Union Telephone Company of Erie for long distance service. The officers are O. C. Sparks, president; R. H. Duntley, vice-president; A. W. Reeves, secretary and treasurer.

PITTSBURG, PA.—With a capital of $25,000,000 the American Union Telephone Company has taken over fifteen Independent telephone companies in Pennsylvania, Southern New York, Eastern Ohio, Maryland and West Virginia and has made arrangements with other Independent companies for a long-distance service covering one-third of the United States. About $300,000 will be expended for the construction of new lines to perfect long-distance connections. The service of the various companies will be improved and the construction of a new line from Sunbury to Pottsville has already been commenced.

ELECTIONS.

HEATH, MASS.—The present officers of the Heath Telephone Company are as follows: President, W. E. Kinsman, of Heath; clerk and treasurer, Herbert Newell, of Shelburne Falls; directors, W. E. Kinsman, D. G. Taylor, of Jacksonville, Vt.; G. E. Davis, of Shelburne Falls; F. L. Tottmen, of Conway; Herbert Newell, W. A. Barber, of Leyden, and S. B. Crafts, of Whately.

TRENTON, N. J.—The Interstate Telephone & Telegraph Company, of New Jersey, recently organized to take over the property of the old Interstate Telephone Company of New Jersey, has elected the following directors: W. S. Hancock, W. R. Swartz, Trenton, N. J.; Robert E. Wright, Charles West, Allentown, Pa.; A. J. Bakewell, New York; John Markle, Jeddo; George N. Reichard, Wilkes-Barre, Pa.

PERSONAL.

BIRCH E. BAUM has been appointed general superintendent of the Vermillion County Telephone Company, with headquarters at Danville, Ill.

A. G. CHASE has been made manager of the Northwestern Telephone Company's exchange at Faribault, Minn.

CARLETON A. COOK has been made local manager for the New England Telephone and Telegraph Company, with headquarters at Concord, N. H.

CARL E. CRAIG has been appointed manager of the Laconia exchange of the New England Telephone and Telegraph Company.

H. C. JONES has been appointed manager of the Home Telephone Company of Owensboro, Ky.

F. P. LANGMAID, who has been manager for the New England Telephone and Telegraph Company at Concord, N. H., has been promoted to the Holyoke exchange.

New Construction in the Field

FORT SMITH, ARK.—The Pan Telephone Company contemplates many improvements in its system at Fort Smith.

PHOENIX, ARK.—Lines are being constructed by the Consolidated Telephone, Telegraph and Electric Company connecting Phoenix with Bisbee, Douglas and Naco. The company's system in Phoenix will also be extended and improved.

ANAHEIM, CAL.—The Home Telephone Company is at work on the construction of its system in Anaheim.

GRASS VALLEY, CAL.—In addition to the Pleasant Valley telephone line which the farmers are to build from Grass Valley, it is quite probable that a line will also be constructed to Wolf.

ALGONQUIN, ILL.—The Interstate Telephone Company contemplates the extension of its lines to Algonquin.

RUSHVILLE, IND.—The lines of the Rushville Co-operative Telephone Company are being extended in that city to take care of its increasing business.

GUTTENBERG, IA.—It is the intention of the Standard Telephone Company to rebuild its line to Clayton Center.

LEAVENWORTH, KAS.—The People's Home Telephone Company, of Leavenworth, Kas., which is the successor of the People's Telephone Company, has commenced work on its new telephone exchange building, which without equipment will cost in the neighborhood of $20,000. A switchboard with a 4,800 line capacity will be installed, and long distance connections established with Kansas City, Topeka, Atchison, St. Louis, St. Joseph and other points.

CLAY CITY, KY.—The Clay City exchange of the East Kentucky Telephone & Telegraph Company, recently acquired by the People's Independent Ice & Coal Company, of St. Louis, Mo., is to share in the improvements, upon which the latter company expects to expend $10,000.

LIBERTY, MAINE.—A line is being constructed by the Liberty & Belfast Telephone Company to East Knox.

PIPESTONE, MINN.—The Western Electric Telephone Company is making many improvements in its system at Pipestone, Minn.

ANACONDA, MONTANA.—About $30,000 is to be expended by the Independent Telephone Company in the construction of its new exchange building at Anaconda.

HOWE, NEB.—The Farmers' Mutual Telephone Company is to establish a new exchange at Howe, Neb.

SANTA ROSA, N. M.—Messrs. Burnett & Morse will shortly begin the construction of a modern telephone system at Santa Rosa.

BUTLER, PA.—The People's Telephone Company, of Butler, Pa., contemplates improvements in its system which will make its plants capable of giving service of the highest grade.

CONESTOGA, PA.—A line between Birdsboro and Reading is being constructed by the Conestoga Telephone Company.

FRANKLIN, PA.—Among the many improvements planned by the Petroleum Telephone Company, of Franklin, Pa., is the installation of a new switchboard, and the stringing of eight miles of cable, making the plant entirely cable. The increased business of the Petroleum Company has necessitated these increased facilities.

READING, PA.—In order to take care of several hundred new subscribers at Reading, it will be necessary for the Consolidated Telephone Companies of Allentown, Pa., to install a new switchboard at that point.

PIERRE, S. D.—The Great Western Telephone Company, which has just completed a line from Pierre to Okobojo, is to construct a line from that place to Forest City, which will make connection with the ranches along the way. The company also expects to build many more new lines, following up both lines of railroad from the Missouri River west.

KURTEN, TEXAS.—About thirty miles of toll line from Kurten to Bryan, Texas, are to be built by Charles Claydon and others of Kurten.

SAN ANTONIO, TEX.—A telephone system is being installed at the government post. The system will connect with various buildings at the military post, where business pertaining to the military service is transacted. An exchange is being installed at department headquarters.

WOODSTOCK, VT.—The Strafford Co-operative Telephone Company is building a line from Woodstock to Bethel, and is also establishing connection with Royalton, Sharon, Hartford, White River Junction, Strafford and Tunbridge.

LADYSMITH, WIS.—Many extensions are being made in the lines of the Chippewa Valley Telephone Company at Ladysmith.

SARATOGA, WYO.—The Rural Telephone Company, of which R. A. Day is president, contemplates many improvements in its system.

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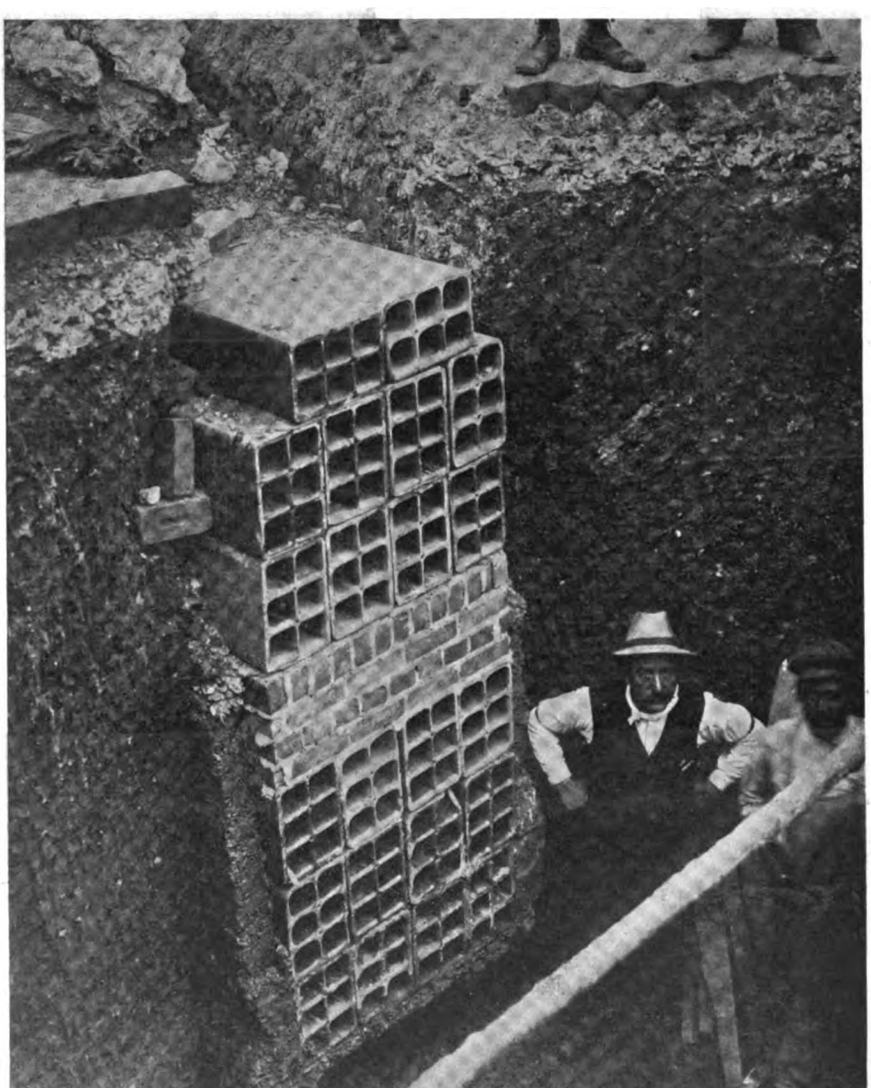
Mammoth Conduit Run at Detroit

By C. A. Shaw.

THE big office manhole recently completed by the Home Telephone Company of Detroit, Mich., on John R. street, in the rear of its proposed new Central Exchange Building, is shown in the accompanying illustration.

The main runs of the underground cable system enter this big manhole from all directions and enter the building in a mammoth run containing 132 ducts, or 22 runs of six multiple ducts. The manhole is 15 feet deep, 16 feet long and 14 feet wide. It is built of the very best sewer brick, with a 13-inch wall cemented on the outside, a concrete floor, and sewer connections to a sewer which cuts under the manhole three feet below the floor.

The four courses of brick shown in the picture as dividing the upper and lower tiers of conduit were made necessary by the presence of one of the gas company's big mains, which was found running through the excavation in such a manner as to make the splitting of the run imperative.



End of Detroit's Great Independent Conduit System, in the Office Manhole.

The big subway system of the Home Company has presented a number of engineering problems of a very interesting nature owing to the fact that Detroit, one of the oldest cities in the country, has about the most variegated lot of pump logs used for piping water and carrying electric light and telephone wires of any city in the country. Some of these old pipes were of a day and age far beyond the memory of the oldest inhabitant and probably dated back to the days of French and English occupancy.

While this old stuff aroused no little interest in the minds of the public, it caused the engineers of the company little or no inconvenience except in its removal from the trenches. The main obstacles in the laying of the subway and the building of manholes were found in the great network of heating pipes, two companies' water mains, gas mains, tunnels (some of great size) and the working conduits and manholes of the existing electric light and power companies and the telephone companies. Notwithstanding these troubles the company's engineers have succeeded so far in laying over a million duct feet of conduit and building over 400 manholes at a cost within the estimates.

The underground system as well as other features of the new plant were designed by Mr. Charles H. Ledlie, consulting engineer, of St. Louis, under whose direction the plant is being built. The plant calls for about 3,000,000 duct feet of conduit and about 1,250 manholes, thus providing subway capacity for 30,000 telephones, at a cost of about $750,000 for underground work alone. The system is so comprehensive that very little, if any, open wire work will be used in the drops. This will make Detroit's new system practically independent of any changes in weather conditions.

For the facts above given acknowledgment is due to Mr. W. B. Woodbury, general manager of the company. The photograph is printed through the courtesy of the Detroit *News*.

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Entertaining Large Audiences by Telephone

By B. L. Johnson.

ONE of the best demonstrations of the possibilities of the telephone for transmitting speech or vocal and instrumental music over one instrument to be heard by a large audience has been made this season at Riverview Park, Chicago.

The Park is the largest garden of its kind in the United States with the possible exception of Coney Island, New York, and the attractions are the newest and most high class entertainment that can be secured, giving this demonstration one of the most critical tests that could be made.

Fig. 1. Horn and telephone receiver suspended from trees.

During the evening musical program of the band or orchestra, the audience was entertained at intervals by a vocal or instrumental selection that sounded as if coming from the trees; many believed that the musicians were concealed in the trees, others attributed the phenomena to ventriloquism, and some insisted that it was the echo of some powerful voice or instrument, but very few ascribed it to the work of a telephone, so well was the instrument hidden.

What was most mystifying was that the music came from various trees in different parts of the garden at short intervals during the same selection. Rendering such selections as the cornet obligato in "Il Trovatore" over the same instrument and accompanied by the orchestra in the band stand together with vocal solos, made this part of the entertainment one of the most attractive and interesting features in the garden.

The equipment used was the new transmitophone recently devised by the International Telephone Mfg. Co., of Chicago, consisting of one sending instrument with three reproducing lines and an accompanist's circuit.

Figures 3 and 4 show the sending station apparatus, consisting of a local battery portable telephone with batteries and battery case, head receiver and a three line circuit changer and other auxiliary apparatus, which was located in a room in the Casino at one end of the park.

The telephone is equipped with an International transmitter that is so made that it will not fry, pack, sizzle or go dead when used with sufficient battery to produce a vibration of the receiver diaphragm strong enough to throw the sound through a megaphone so that it can be heard by a large audience.

For cornet or vocal solos 18 volts or 12 cells of "1900" dry batteries are connected in series with the one ohm primary winding of the induction coil, through the transmitter and back to the battery which completes the primary circuit; for whistling solos 12 volts are used, and for ordinary conversation to be heard clearly over a broad area 24 volts give the best results.

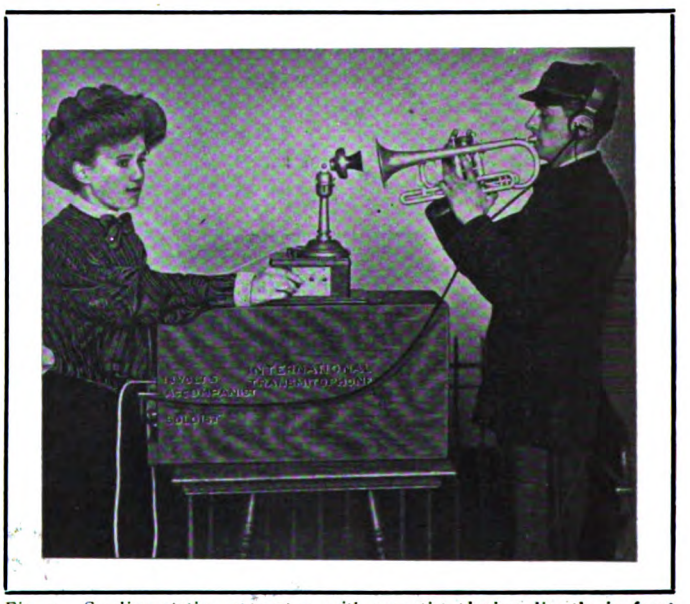

Fig. 2. Sending station apparatus, with cornetist playing directly in front of transmitter.

Though one of these transmitters has been used on this work the entire summer season and becomes so heated at every evening's entertainment when in continued operation for 15 or 20 minutes that one could not bear to touch the outer transmitter cup, it is said to have shown no signs of deterioration.

The durability and efficiency of this instrument is said to be largely due to the quality of the electrodes and granular carbon used in its construction. The carbon is made from a deep mine, selected crystal coal with the granules broken to a uniform and proper size, smoothly polished,

Fig. 3. Simple arrangement of transmitter suspended on wall for transmitting piano music.

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thoroughly cleaned and hardened to the greatest degree possible.

The granular carbon is retained with the electrodes in a chamber that is supported on the diaphragm and the sharp vibrations of the diaphragm when the instrument is used keeps the granules agitated and prevents packing.

All the working parts are so accurately made and adjusted and the transmitter diaphragm so evenly dampened, that the loud blasts of a cornet or bass horn are transmitted as clearly and distinctly as the soft, sweet voice of the lady singer.

The sending station is provided with a switching arrangement with a cam lever key for each reproducing circuit, so that the music can be reproduced through any one of the receivers at intervals, or through any two, or through all three simultaneously.

The circuit changing switch box is provided with proper binding post terminals in order that the lines may be conveniently connected.

The batteries are connected with a cut in jack mounted at one side of the battery cabinet, so the sending instrument may readily be connected with the desired voltage. The sending station is also provided with a head receiver which is connected by a separate circuit to a highly sensitive transmitter placed in the band stand as shown in Figure 3 at the left of the piano, to enable the soloist to hear the orchestra or band and keep in time and tune with the accompaniment.

One of the reproducing instruments is shown in Figure 1, suspended in a tree at the right of the center of the picture. It consists of a very powerful bi-polar horse shoe magnet receiver, provided with a large megaphone attached to the earpiece. The megaphone is painted black so it is not easily seen when placed in the trees above the lights.

The rubber covered wire which is used to connect the reproducers with the sending station is run directly into the shell of the receivers and is thoroughly wrapped where it enters the shell with rubber tape to prevent moisture entering the working parts.

This demonstration of the transmitophone showing the possibility of transmitting to a large number of people at one time not only opens a field for telephone apparatus that may be developed to an extent almost without limit, but it also shows the great efficiency and durability of the transmitter as made at the present time which is of considerable interest to every manager and owner of an Independent telephone system.

Fig. 4. One of the sending stations showing head receiver used by soloist to assist her in keeping in time with accompaniment.

Election Returns by Telephone

By J. P. Boylan.

ELECTION night is always a rush period with large telephone companies. A tremendous number of private messages are sent over the wires on that night, and in addition, the telephone companies furnish their subscribers with the returns, which involves a great amount of extra work and necessitates a careful system of organization to avoid the hopeless congestion of traffic.

In addition to furnishing the local and State returns, last Fall, to the twenty-three thousand subscribers connected with its system, the Cuyahoga Telephone Company, of Cleveland, Ohio, also arranged to operate a large stereopticon and moving picture machine on the public square, and another at the mammoth Armory of the Cleveland Grays, where the Annual Food Show was in progress. It was planned to alternate the bulletins and moving pictures at these points with catchy telephone advertisements.

The public square site was an ideal one for the purpose, being in constant view of the main transfer points where all the street car lines in the city pass, and the crowds alighting from the cars were at once attracted, and a great number of them held at this bulletin. About eight thousand is a conservative estimate of the number of persons constantly congregated about this display.

Large pads of paper bulletins with printed heading, "Cuyahoga Telephone Bulletin," were posted in the hotel lobbies, and also at twelve of the large private clubs. At the principal hotels and clubs two clerks were employed, one receiving bulletins and announcing them by megaphone, the other printing and posting bulletins for the benefit of late comers.

The company, guided by past experience in furnishing election returns to the public, appointed the various committees fully four weeks prior to the State election. The organization of the general committee was as follows:

Collecting and editing news	Asst. General Manager.
Distributing of news—local	Central Exchange Manager.
Distributing of news—long distance	L. D. Asst. Gen'l Manager.
Election equipment—construction and maintenance	Supt. of Equipment.
Stenographers and stationery	Supt. of Supplies.
Office boys and messenger service	Chief Clerk.
Commissary	Matron.
Display on public square	Supt. of Service.
Display at Grays' Armory	Supt. of Maintenance.

The collection and editing of the news was handled by the chairman of the General Committee, Mr. W. B. Woodbury, now General Manager of the Home Telephone Company of Detroit, who, before entering the telephone field, was a prominent Ohio newspaper man. Terminating in his office were private wires from the local Board of Elections and local newspaper offices, the long distance manager's office, and a private line from the Nottingham, Ohio, station of the DeForest Wireless Telegraph Company. The latter agency was expected to furnish dispatches from New York City and other Eastern points where the Independent long distance lines had not yet been constructed.

On Mr. Woodbury's staff were six expert accountants, who were provided with complete statistics, including the total vote of every precinct in the State at the last previous election. It was the duty of these men, as each precinct was reported, to furnish information showing the gain or loss as compared with the last vote. They were also expected to maintain running

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totals of each candidate's votes, so that at intervals the public could be posted on how the race stood up to the time the bulletin was issued. This feature was much appreciated, as the public did not seem to care so much the result of a certain ward or precinct, but appeared to be more interested in the total votes and pluralities.

The form of bulletin issued most frequently was somewhat on this order:

84 PRECINCTS OUT OF 164
IN THE CITY GIVE TOM JOHNSON
5,400 MAJORITY.

As soon as an accountant could compute and compare figures this would be followed by another bulletin after this fashion:

ACCORDING TO PRESENT DEMOCRATIC
GAINS IN THE CITY, JOHNSON WILL
HAVE 12,000 MAJORITY.

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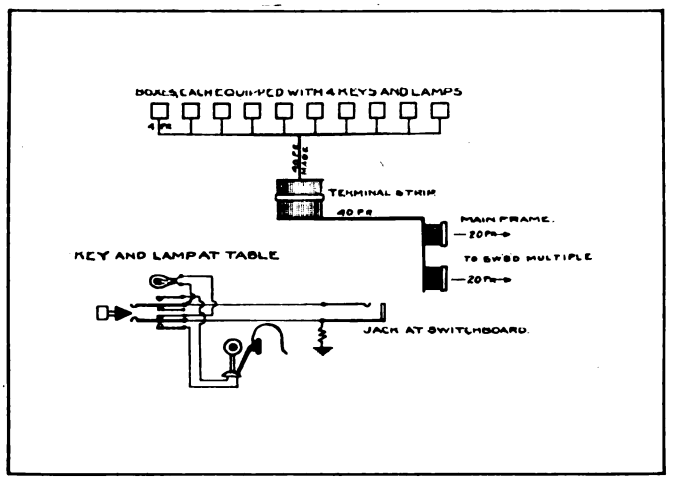

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Wood	574	297	156	191.3	3
Shore	900	340	264	300	3
Lake	1,308	465	410	436	3
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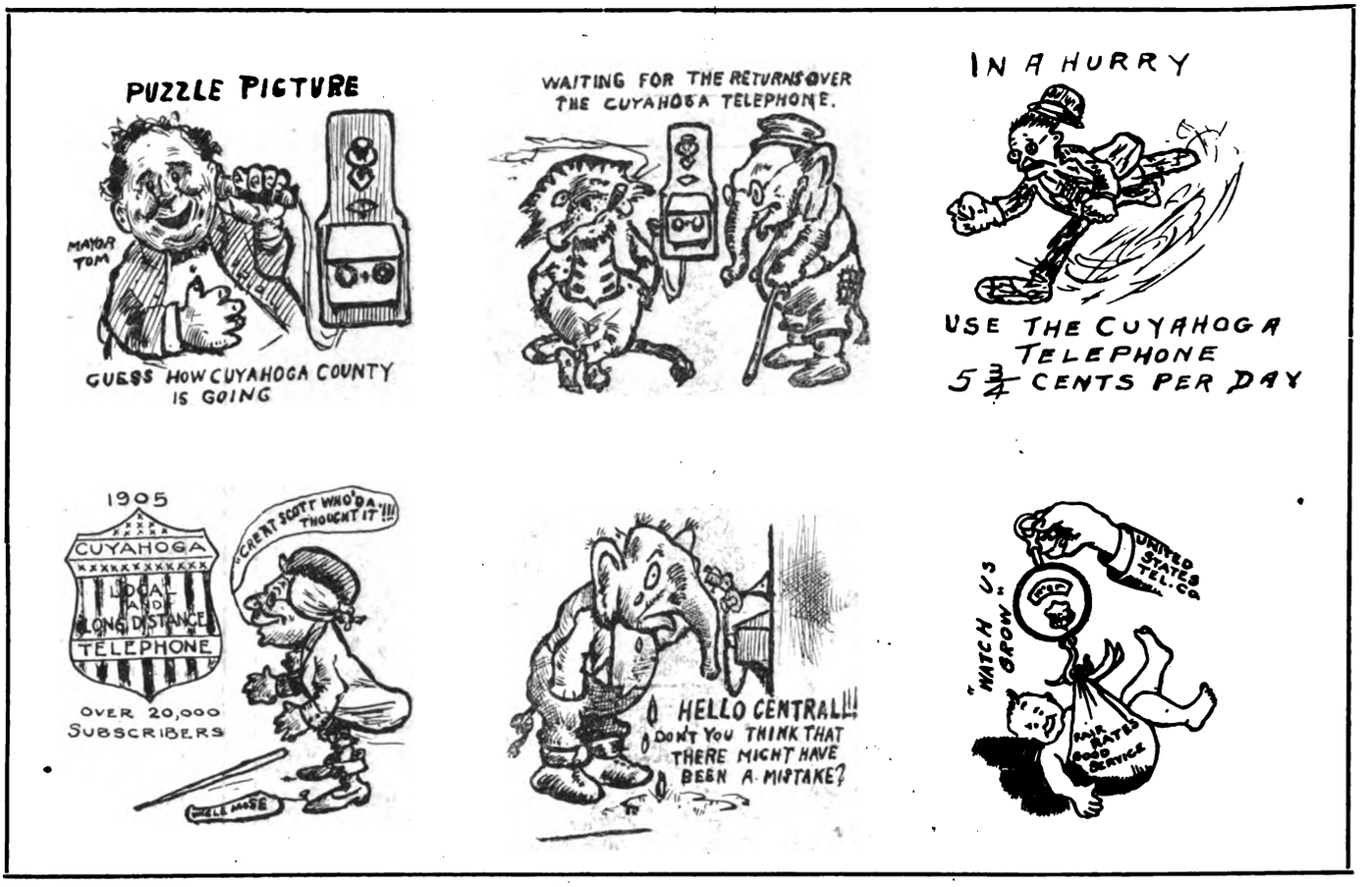
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totals of each candidate's votes, so that at intervals the public could be posted on how the race stood up to the time the bulletin was issued. This feature was much appreciated, as the public did not seem to care so much the result of a certain ward or precinct, but appeared to be more interested in the total votes and pluralities.

The form of bulletin issued most frequently was somewhat on this order:

84 PRECINCTS OUT OF 164
IN THE CITY GIVE TOM JOHNSON
5,400 MAJORITY.

As soon as an accountant could compute and compare figures this would be followed by another bulletin after this fashion:

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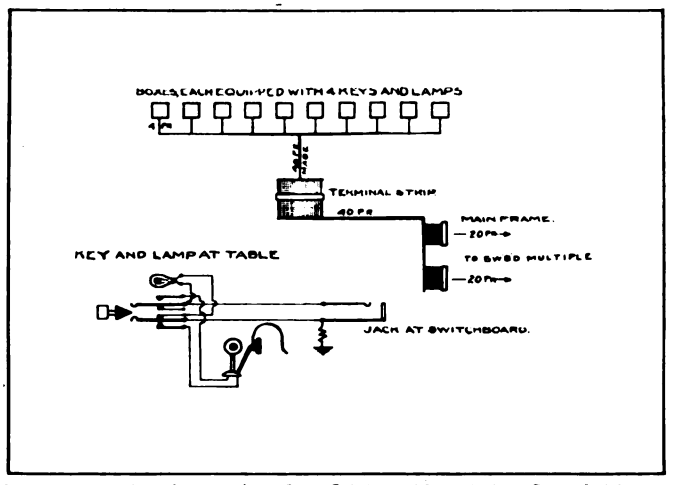

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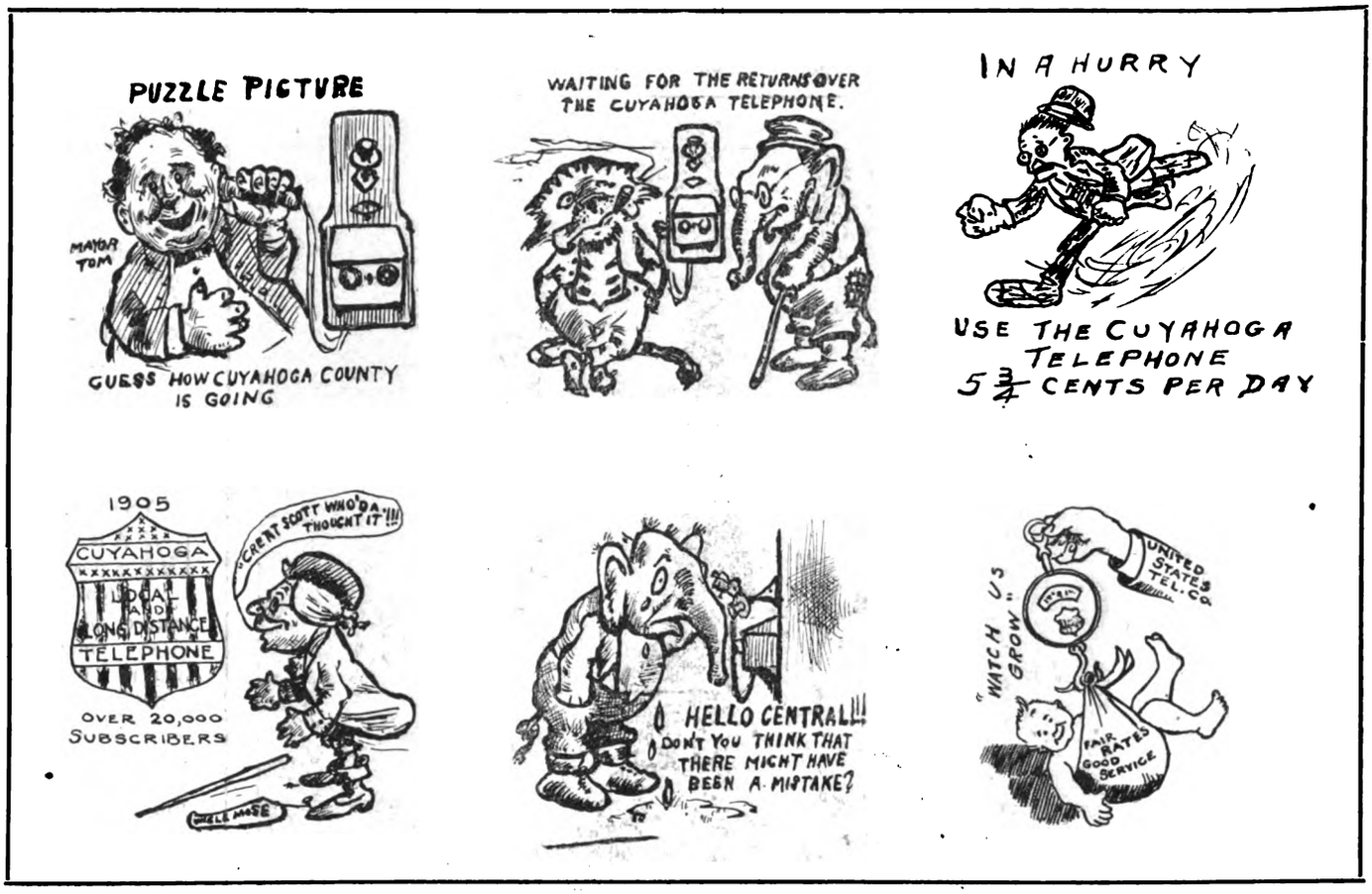
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The Regal Telephone of Spain

By Jose de Leon.

ENTHUSIASM, devotion and joy were manifested by all of the people of Spain on the occasion of the recent marriage of their sovereign to the Princess Eugenia of Battenberg. All the people of the country took measures to make their good wishes for the happiness of their new queen evident, and it was this sentiment which inspired the employees of the Government Department of Telegraphs, which also has charge of the telephone systems of the country, to have made a magnificently mounted telephone as a gift to the queen.

Through the courtesy of the leading illustrated paper of Spain, "La Illustracion Española y Americana," and of the Director General of the Government Department of Telegraphs, THE AMERICAN TELEPHONE JOURNAL is enabled to present to its readers the accompanying illustration of this beautifully designed instrument, and the information concerning it. It was designed by the noted sculptor Sr. Pola, and is considered by those familiar with his work to be a notable triumph of one who has designed many beautiful works in metal. The design embodies three main divisions; the base of modern form worked out in curves of the periods of Louis XV. and Louis XVI. This terminates at each of the four corners in the head of a lion, beneath which are two paws upon which the stand rests. In the centre of this base appears an inscription which makes apparent the object of the work. Springing from the base rise columns designed to represent the pillars of Hercules, at the foot of one of which a boy supports the shield of Spain, while upon the opposite side a little girl holds the shield of England. The two are supposed to be communicating appropriate sentiments through the telephones which they are holding. Mounted in the central space, as a means of partially concealing the location of the push button for calling, is provided a crown of fine workmanship, while behind it appears the bell upon which signals are received, this being suspended from the upper portion of the stand by a design representing an eagle with wings extended as though he were about to rise.

Beautifully Modelled Telephone and Stand of Silver Presented by the Employees of the Government Telephone and Telegraph Department to the Queen of Spain.

The upper part of the design is an entablature worked out after the manner of sculptures of the Renaissance period and upon this stand two Cupids who uphold the telephone. The transmitter mouthpiece is beautifully wrought in the design of the white lily of Spain, its base surrounded by tiny flowers. In the centre of this portion of the stand appear the shields of Spain and England, united by a branch of laurel. The entire stand is of silver.

The sympathetic design and richness of execution make this in all probability the most magnificent telephone which has ever been constructed, and it is a most fitting gift from a loyal department of the Spanish Government.

TRANSFER OF BRIGHTON MUNICIPAL TELEPHONE SYSTEM.

MARKING another step in the failure of ill-advised municipal officers to successfully operate a telephone system, the city's plant at Brighton, England, has been recently sold to the English Post Office department.

It was admitted for some time that the system had not been operating successfully, nor, indeed, could its construction have been called a success. According to the *Electrical Review* (London), the original estimate provided for 2,080 subscribers and public station lines at a total cost, allowing for 600 partially completed spare lines, of £43,280. The actual capital expenditure is, as noted above, £52,718, and the system actually contains 1,514 subscribers and public lines. According to the estimate the present system, including all extension stations and other extras and allowing for 600 spares, should have been built for about £37,000. In proportion to business done, the estimate has been exceeded by £15,000, or 40 per cent.

It is noteworthy that in this case, as at Glasgow, the sale admits of the continuance of competition.

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QUERIES

NUMBER AND SCALE OF VOLTMETERS ON TWO-POSITION TEST SET.—(788.)

Being about to install a second position on our test set we would like to ask your advice on some points about which we are in doubt. In the first place, is it necessary or desirable to use a voltmeter at each position or can we put in a switching key so that both testers can use the same instrument?

If we install a second instrument ought it to be the same as the first, or should they have different scales or resistance, so that we can use them on different classes of lines? P. F.

We understand that at first your second testing position will not be constantly in use, but rather designed to facilitate the prompt location of troubles in times of emergency, as, for instance, after a storm.

Under the circumstances it would be possible, by installing a switching key, to use the same voltmeter for both positions, and so make a slight saving in the initial expense. Such an arrangement, however, would not be economical in the long run. At times when both men are required to work together there would unavoidably be more or less confusion and interference with one another which would be productive of much annoyance and delay. Any saving effected by putting off the buying of a second instrument would be soon offset by the cost of the wasted time of the wire chief and his assistant.

With regard to the type of voltmeter for the second position, if the first is of satisfactory range, it is desirable to have a similar instrument at the second position. The two testers should

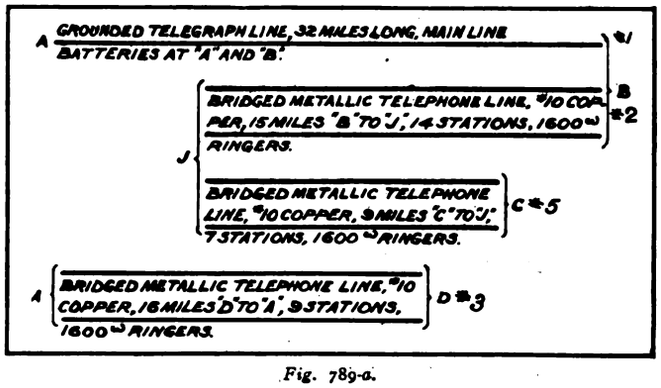
A
GROUNDED TELEGRAPH LINE, 32 MILES LONG, MAIN LINE
BATTERIES AT "A" AND "B".
#1
BRIDGED METALLIC TELEPHONE LINE, #10 COPPER, 15 MILES "B" TO "J", 14 STATIONS, 1600Ω RINGERS.
B
#2
J
BRIDGED METALLIC TELEPHONE LINE, #10 COPPER, 9 MILES "C" TO "J", 7 STATIONS, 1600Ω RINGERS.
C #5
A
BRIDGED METALLIC TELEPHONE LINE, #10 COPPER, 16 MILES "D" TO "A", 9 STATIONS, 1600Ω RINGERS.
D #3

Fig. 789-a.

be able to change positions at any time, and to work at either position with equal facility. Practice in testing enables a man to work very quickly, judging conditions on the line accurately from the behavior of the index pointer of the voltmeter. If the two instruments were not alike each would have to adjust himself to new conditions when he changed from one position to the other. This would unavoidably lead to a loss of time, and occasionally in the rush of work would be a source of error. By the use of similar instruments any possibility of these undesirable things would be avoided.

ARRANGEMENT FOR SIMULTANEOUS TELEPHONE AND TELEGRAPH WORK.—(789.)

The enclosed sketch (Fig. 789a) shows the layout and nature of a group of our lines. I wish to get rid of primary batteries at A and B and install a storage battery for the telegraph line at C. Is it possible to use No. 2 from B to C, No. 5 from C to D and No. 3 from D to A, looping storage battery in at C, thus making a metallic circuit telegraph line of No. 1? Would you advise use of choke coil across the telephone circuits, or would high resistance carbon rods be better? W. M. L.

Our interpretation of what you desire to accomplish is indicated in Fig. 789*b*, in which the lines are connected together through six repeating coils, each connected up as a retardation coil with a connection taken off the central point. In operating these circuits you should have no difficulty if a coil of appropriate type is chosen. It should have windings so arranged as to give a perfectly balanced condition of the lines. One commercial type of coil which would probably give good satisfaction in this circuit may be described as follows:

It is a parallel wound repeating coil in which the four wires of the four windings are made into a cable and then wound in the

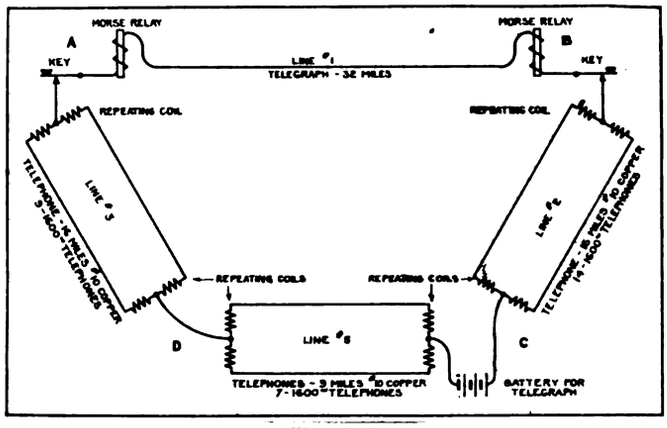

Fig. 789-b.

regular way. The core is made from a bundle of fine annealed iron wires and is bent back over the ends so as to overlap and completely encase the winding. This gives a repeating coil or transformer of the "hedgehog" type. The complete coil is encased in a boiler tube, the ends being closed up with sheet iron. This outside casing is used to prevent cross talk to other circuits or apparatus.

This resistance of each quarter of this repeating coil is approximately. 170 ohms, so that when the windings are connected in series, as shown in the accompanying sketch, Fig. 789-*c*, the total resistance across the line circuit will be 680 ohms. Fig. 789-*c* also shows just how to strap the terminals of this coil in order to put all of the windings in series and where to bring out the middle point. There would be six of these coils required to make the telegraph circuit metallic.

As there are no grounds present on the entire system, ordinary protection against lightning, and crosses with lightning and power circuits will be sufficient. If, however, a ground is used

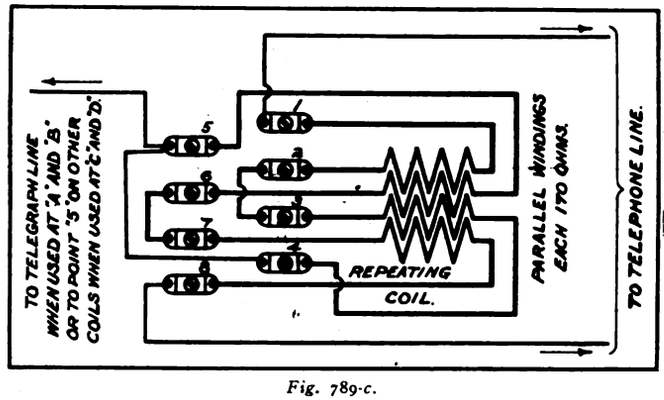

Fig. 789-c.

at any point in the telegraph circuit it will be necessary to provide additional protection between the coils as there would then be a good invitation for a discharge which might put the entire system out of business.

The use of high resistance carbon rods in this connection, if we understand your inquiry to relate to their substitution for the coils, is wholly impracticable. The coils are used because they permit the free passage, subject to Ohm's law, of direct telegraph current, but prevent the short circuiting of alternating voice currents owing to their relatively high impedance to current of these frequencies when connected as shown.

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THE EDITOR'S PAGE

UNBIASED COMMENT.

IN Omaha lively discussion of matters telephonic has been the rule for some time, and since the submission of the question of granting a franchise to an Independent company to popular vote interest has been especially keen.

Under the heading "One Telephone or Two" the Omaha *Bee* recently printed the following mild little editorial comment:

"With the Mayor's signature attached to the franchise ordinance the question is put up to the people of Omaha whether they want one telephone system or two. By ratifying the ordinance granting the proposed franchise for an Independent company they would answer this question affirmatively—by rejecting the franchise they would answer it negatively. Much is to be said on both sides of this question. It is undeniable that there are advantages and disadvantages to a dual telephone system, just as there are advantages and disadvantages to the present single telephone system. The question resolves itself into which offers the greatest net benefits to the community."

Its author may not have carried his paper very far in the way of "moulding public opinion," but he has certainly brought forth a literary gem upon which the most ardent supporter of either side can gaze long and earnestly, and at last put it aside saying, "Now, where is the harm in that?"

RUSSIAN COLONISTS IN CANADA USING TELEPHONES.

SO much has been written about the wanderings and eccentricities of the Doukhobors that an interview recently given out to the press by Peter Verigin, the leader of this group of people, is especially interesting. It seems that they are in reality becoming thoroughly imbued with the spirit of progress which so completely pervades Western Canada at the present time, and have already become converted to the telephone habit. Some stations have been installed, giving connection to distant points, and the construction of a very complete system throughout their settlements is expected to be taken up within a short time.

It is only a few years ago that we saw some of these people, in a most untidy condition, huddled with their belongings which were tied up roughly in great cloths, in old cars. They were in a railway yard awaiting the start for their new homes in the Northwest. They seemed to be rather a silent people, watchful of the many new things passing before their eyes, and more disposed to listen to the strange sounds they heard than to talk about them. So perhaps it is not so very remarkable that one quality should modify the other and that they should have learned quickly of the benefits their neighbors enjoy, and in wide stretches of farming country wish to keep more closely in touch with one another than is possible when communication may be had only after a long ride. These are industrious folk, it is said, and in the same way that it has to others, the way in which a telephone can be used to cut out these time-eating, profit-killing and wearisome journeys for necessary trifles must have strongly appealed to them.

NEWS BY TELEPHONE IN HUNGARY.

A EUROPEAN exchange reports that Budapest has the only news-furnishing corporation on the continent which telephones instead of printing its news. This journal is the *Hirmondo,* which has now been established for several years in the Hungarian capital. Free of cost it installs a telephone in the subscriber's house or flat, and from its central office the news is announced by a clear-speaking elocutionist, who precedes each item with a general call. It is an all-day service, beginning at 9 o'clock in the morning, when it leads off by sending the correct time to all subscribers, repeating this hour by hour. The programme of public events, meetings, and the like for the day is announced and at intervals the movements of prices on the stock exchange.

At 12 o'clock the news of the day at home and abroad is telephoned to subscribers in a clear and succinct narrative. To while away the post-luncheon hour the subscriber may take up his receiver and listen to the recital of an original and complete short story by an accomplished ranconteur. From 4:30 to 6:30 subscribers are in electrophonic connection with the musical performance of the Houved military band.

From 7 o'clock until 11 on five nights in the week the subscriber, sitting in his own home, may enjoy the music and singing at the Grand Opera House. On the other two evenings in the week he commands the performance of the gypsy band at Budapest's leading cafe.

Truly a remarkable story is this, closing with the statement that the cost of this complete service of daily news and evening entertainment is 33½ cents a month.

CIRCUMSTANCES ALTER CASES.

ECONOMIC waste is a very bad thing, we are all told. That it is so beyond doubt will be admitted by most of us. This admission hurts no interest, for it is purely a general proposition. When our friends in the Bell companies attempt to tag the Independent telephone movement with this useful truism, however, there is always trouble brewing. The motto in itself is true enough, and all right in its place, but when it gets thrown about loosely it should not be allowed to rest in a spot where it can mask the true appearance of another fact.

Where it has been applied to telephone competition it does not seem to have stuck very long in one place. Surely the tag has been pinned to the coat tails of enough of our builders of Independent plants, in cities enough, and times enough to let it prove its staying qualities, if any it has. But it seems to be like a poor unballasted Flying Dutchman of the air, doomed always to be moving on its creaking way from place to place without finding a proven case among the Independent telephone companies.

But there is economic waste connected with the telephone business just the same. Some of it appears in chunks which are small, but they do stand out with remarkable clearness. One of these chunks was made in Omaha the other day. It will interest our readers, and next week they may see it in our pages.

SPECIAL USES OF THE TELEPHONE.

LITTLE short of marvellous is the fact that, many as are the classes of affairs in which the telephone has assumed a prominent part, there is hardly a week goes by without bringing the news of its introduction into some new phase of human activity.

For instance, within the last few days there has come to general notice a rather widespread discussion as to the propriety of the reception by telephone of confessions by Roman Catholic clergymen. In legal affairs the uses which may be made of the telephone as a means of communication have been the subject of many decisions; on the sea and on land men have found it indispensable, and it is now frequently used to temporarily connect those on shipboard with the people ashore. It has been installed high in the air, on tall buildings and the tops of mountains, and is equally serviceable far below the surface of the earth for the operation of mines.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

UNDERBUILDING AN IMPROPER METHOD OF CONSTRUCTION.

Will you kindly let me know what are our legal rights in following case. Twelve years ago I built a line along a railway right of way, and about two years after a local electric light company built a line parallelling my line for about a half a mile. This line was so poorly constructed that it was an eyesore to all who had to pass it, and for appearance sake, when the light company asked permission to use our poles in order that they might take down those paralleling my line and use them elsewhere, I gave them permission to put a six-pin arm and wires on my poles; the additions, service wires, etc., lack of insulation and generally filthy maintenance methods of the light company so disgusted me that this year I rebuilt that portion of my line, using taller poles and placing a line of new poles about 3 feet 6 inches closer to my track than the old line. Wishing to treat the light company fairly I allowed old poles to remain standing so that they might continue to use them.

Recently a new factory started to build in the vicinity and asked for a siding which I put in, and in order that the factory might use the siding notified the light company to move or raise their wires to not less than 24 feet above rail. The light company erected four new poles, placing them between old line and new line so that top of their poles are between my wires, and their arm projects so far as to effectually shut me out from ever using arm in second gain on my poles. I remonstrated with the superintendent of the light company, and he raised the question of ownership of right of way, claiming that one of my poles was not on my own property. This may or may not be true and would be very difficult and costly to decide, and is a question I do not care to go into, but aside from the meanness of the action toward one who had always been glad to give light company all reasonable privileges, I claim that light company had no right to underbuild my line as it has done, compelling me to go to the expense of putting on extension or erecting taller poles to escape inductive troubles and possible burn outs from the light company's lines. Am I right in this claim and can you cite decisions that would uphold it?

W. M. L.

YOU are right in your contention that the electric light company has no right to underbuild your line as it has done. Underbuilding was held to be an improper method of construction in the case of the Northwestern Telep. Exchange Co. v. Twin City Telep. Co. decided in July, 1901, by the Supreme Court of Minnesota. (95 S. W. 460.) The first occupant of a line has the right to an injunction to prevent any subsequent builder from interfering with his line by contact, induction or otherwise. Nebraska Telep. Co. v. York Lighting Co., 43 N. W. 126. A reasonable and safe distance must be kept between wires. Northern Telep, Co. v. Iowa Telep Co., 98 N. W. 113. See also Western Union Teleg, Co. v. Guernsey, Scudder Elec. Light Co., 46 Mo. App. 120, 3 Am. El. Cs. 425; Paris Elec. Light & Ry. Co. v. S. W. Teleg. & Telep. Co., 5 Am. El. Cas. 262. Joyce on Electric Law, Sec. 517.

LICENSE TO ATTACH WIRES TO BUILDING.

A SUIT for damages for trespass was brought by Ratje Bunke against the New York Telephone Company and a judgment given for the plaintiff. The plaintiff showed that at the time he purchased the premises in question, there were sixteen telephone wires attached to a stock fastened to the chimney on his premises, and that some of them connected with another chimney on his house and continued on across his premises diverging to other houses, and that they had so remained; that they came from a terminal station owned by the defendant for which it had secured a license. It was shown by the testimony of a former employee of the company that these wires belonged to the defendant. The court held the ownership of the wires properly proven.

The former employee of the company testified that the use of the plaintiff's roof by the company was worth $100 per year. The jury awarded only $50 damages. The superintendent of the company testified that the privilege was worth nothing and he had in no instance paid for the privilege. The company contended that the former employee's evidence was incompetent and did not follow the proper measure of damages. The plaintiff was not deprived of the possession or use of his building. The court held, however, that the evidence and measure of damages were both correct.

The company also contended that there was a presumption that the original entry upon the plaintiff's premises was by license and was therefore not a trespass, and that there can be no trespass until that license is revoked, and the company notified to remove its wires and attachments. The court held that even if there had been a license it was revokable at pleasure; that the conveyance of the premises by the licensor was a revocation thereof for which the licensee must take notice. Many authorities were cited. The court also held that the trespass was a continuing one. Judgment for plaintiff was affirmed. Bunke v. N. Y. Tel. Co., 97 N. Y. Supp. 66, 110 App. Div. 241.

SUIT FOR STATUTORY PENALTIES.

THE Texarkana Telephone Company, of Texarkana, Tex., has filed suit in the Miller County Circuit Court against the Southwestern Telegraph Company for alleged statutory penalties aggregating $100,000 for failure to comply with the Arkansas law requiring it to permit physical connections with its long distance wires for the transmission of messages by the plaintiff.

The Arkansas statute provides a penalty of $100 per day payable to the company against whom discriminations are made. The complainant alleges that plaintiff has twice within the past two years filed written demands with defendants for connections with its long distance wires, but said demands have been refused and ignored. The suit will come up for a hearing in November.

GRANTING OF FRANCHISES IN IOWA.

What are the requirements of the Iowa statutes for the granting of franchises in cities and towns? We understand that it must be submitted to popular vote in some way. Please explain how. H. B. R.

THE statutory provisions in Iowa, found in Section 776 of the code of Iowa for 1897, provide that no franchise shall be granted unless a majority of the legal voters voting thereon vote in favor of the granting of such franchises at a general or special election. The city or common council may order the franchise submitted or may submit it on the petition of twenty-five property owners or each ward in a city, or of fifty property owners in an incorporated town. Four weeks notice of submission of the franchise must be given and the party applying therefor must pay the expenses of the election.

MANDAMUS SUIT TO COMPEL SERVICE.

A MANDAMUS suit has been filed in the circuit clerk's office at Jacksonville, Fla., by Justice of the Peace E. B. Drumright, of that city. He has been urging the Peninsula Telephone Company to give him telephone connection between his residence and office for a long time, but having failed to get it, has filed suit to compel its installation. The justice's residence is in a section of town somewhat remote from other telephone subscribers, and he has consequently been left without the convenient "hello" privilege until impelled to make an effort to secure it through the courts.

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IN THE OPERATING FIELD

INDEPENDENT PLANT AT LEAVENWORTH, KAS., TO BE REBUILT AND EXTENDED.

CONSTRUCTION of a new building for the People's Home Telephone Company of Leavenworth, Kas., which is to cost in the neighborhood of $20,000, has been recently started.

The People's Home Telephone Company of Leavenworth is a corporation organized under the laws of Delaware and the incorporators are William George, of Aurora; L. R. Parker, Aurora; A. B. Conklin, Aurora; W. T. Hewitt, Leavenworth, Kas.; B. G. Richmond, Elburn, Ill.; E. D. Lysle, Leavenworth. W. T. Hewitt, of Leavenworth, is the president of the company, William George is the vice-president, A. B. Conklin is treasurer and superintendent of construction, and L. R. Parker is secretary and general manager.

The new company is the successor of the People's Telephone Company of Leavenworth and bought out the former company, with its franchise, which has twenty years yet to run, on August 1st.

The old company had about 600 telephones in operation when purchased by the preesnt company, but since acquisition of the rights by the present organization five miles of trench have been partly completed and poles and wire have been rushed to the city to provide for a greatly increased capacity.

A switchboard with a 4,800 line capacity will be put in the new building, while long distance communication with Kansas City, Topeka, Atchison, St. Louis, St. Joseph and all of the important centers in the country is already established. The work of reconstruction is being carried on under the direction of J. Fred Malthaner.

TELEPHONE SYSTEM TO BE INSTALLED BY ILLINOIS CENTRAL RAILWAY.

A LOCAL telephone system connecting various offices in Council Bluffs and Omaha is to be constructed by the Illinois Central Railway Company. The system is expected to be a very complete one, as the company has decided that the use of the telephone greatly facilitates the transaction of its business. This is another example of the progress in telephone use which is being made by the railway companies at the present time.

MUTUAL TELEPHONE COMPANY REPORTS SATISFACTORY PROGRESS IN ERIE, PA.

VERY interesting figures intended to show the financial condition of the Mutual Telephone Company, of Erie, Pa., have been recently given out. These take the form of a complete summary of the business for the past eight years ending October 1st.

This set of figures shows total collections of $308,095.08; expenses, $176,060.34; gross earnings, $132,034.74; bond interest, $29,534; net earnings, $102,500.24; dividends, $44,012.50; balance on hand, $58,487.74.

This company was organized in Erie in 1897 with a capitalization of $50,000. The first switchboard installed had capacity for equipment to take care of four hundred subscribers. At this time many persons thought this number far larger than was needed, as the Bell Company had a list of five hundred subscribers, and it was thought that the territory would supply no more users of the telephone. In less than a year the number of subscribers had over-reached the capacity of the switchboard, and another one of the same size was installed, giving room for eight hundred subscribers. This in turn was outgrown, and one of the old switchboards was replaced by another of eight hundred capacity, the total capacity then being twelve hundred.

Again, in 1900, the company having outgrown its old quarters, a new building was erected. Initial equipment for 1,500 subscribers was placed, and in 1904 this equipment was increased to three thousand capacity, where it rests at the present time.

At the present time the near approach of still further extensions, which is foreseen owing to the continued increases in the demand for Independent telephone service, has caused the company to start work upon an addition to its building which will double the amount of floor space available.

The growth in the company's business has been, naturally, accompanied by a corresponding increase in the amount of money invested in its plant. The capital stock has been increased three times since the organization of the company. The first time it was increased to $75,000; December, 1903, it was increased from $75,000 to $100,000, and again at a meeting held Oct. 1, 1906, an increase was authorized from $150,000 to $500,000.

ADDRESSES MADE BY OHIO INDEPENDENT LEADERS AT NINTH DISTRICT MEETING.

AT the meeting for District No. 9 of the Ohio Independent Telephone Association, which was recently held in the telephone exchange building at Mansfield, Dwight E. Sapp, of Mt. Vernon, the district vice-president, was in the chair.

Several papers of local interest were read. The figures given by the district officers showed a vigorous growth for the Independent companies and a decline of the Bell company.

Following an established custom, the Mansfield Telephone Company gave all its stockholders and all the visiting telephone men a banquet, which was attended by 150 people.

Among the speakers at the meeting and the banquet were: James S. Brailey, of Toledo, president of the United States Telephone Company; J. B. Hoge, of Cleveland, president of the International Independent Telephone Association; Frank L. Beam, president of the Ohio Independent Telephone Association; C. Y. McVey, of Cleveland, executive committeeman of the Ohio Association.

Mr. Brailey and Mr. McVey gave an insight into the future plans of the United States Telephone Company and called attention to the marvelous growth, extension and improvements which it has already made.

TELEPHONE EDUCATION OF PEOPLE OF PROVIDENCE, R. I., PROCEEDING RAPIDLY.

ASSISTED by R. M. Eaton, general manager of the Niagara County Home Telephone Company, the Home Telephone Company, which has an application for a franchise pending in Providence, R. I., is attempting to give to the public in that city an idea of the conditions prevailing in cities where there are competing telephone systems. At present the rates in Providence are high, the service is said to be none too good, and it would appear that the people of the city have much to learn about the things which a telephone company can and should do.

Some extremely interesting and attractive printed matter has been issued and widely distributed. The Bell company, unable to dodge the facts which are very strongly set forth in the various papers which have been sent out, is much disturbed by this campaign.

FINANCIAL REPORT ISSUED BY INDEPENDENT COMPANY OPERATING IN MASSACHUSETTS.

THAT considerable business is now coming to the Heath Telephone Company, which operates Independent lines in Western Massachusetts, was shown at the recent annual meeting. H. Newell, clerk and treasurer, submitted reports showing the receipts and expenditures for the year. The receipts total $23,674. The larger items are, sales of stock, $9,390, rentals, $8,616, messages, $354, premiums, $495, loans, $4,400.

Expenditures were $23,489. A six per cent. dividend called for

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$2,204, new construction $14,437, and for maintenance and repairs $6,848.

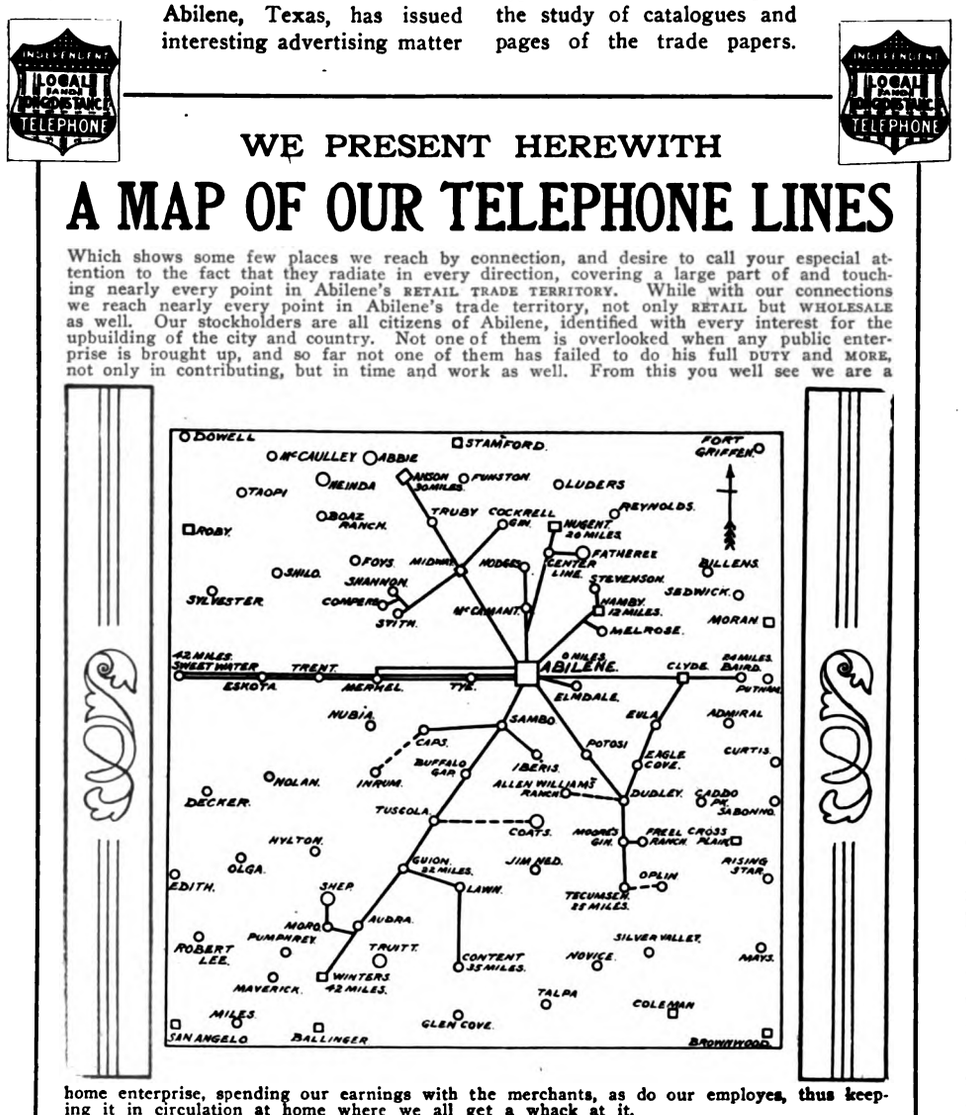
The by-laws were amended to increase the number of directors from five to seven, and W. A. Barber, of Leyden, and Seth Crafts, of Whately, were added. Growth has been very satisfactory, as at the close of last year there were 669 telephones in use, and at the close of this year there are 853 in use, showing an increase of 184 telephones. There have been extensions in Whately, Hawley, Charlemont, and in Leyden the extension is nearly finished.

Officers elected for the ensuing year are: President, W. E. Kinsman, Heath; clerk and treasurer, Herbert Newell, Shelburne Falls; directors, W. E. Kinsman, D. G. Taylor, Jacksonville; Geo. E. Davis, Shelburne Falls; F. L. Totman, Conway; H. Newell, W. A. Barber, Leyden; S. B. Crafts, Whately.

IMPROVEMENTS IN THE PLANT OF THE ROBERTS TELEPHONE AND ELECTRIC COMPANY, OF ABILENE, TEXAS.

WITHIN a few days the Roberts Telephone and Electric Company, Abilene, Texas, has issued some very interesting advertising matter to the people of the towns in which it operates. This company has recently built a new and attractive building in a central section of the town of Abilene, and has placed in its new headquarters a first class central energy switchboard. The company has also installed several miles of cable, using new poles wherever desirable, and has brought its open wire plant into first class condition. The company has taken pains to bring its system thoroughly up to date, and make all preparations for giving a high grade of service.

In order to inform the people of the city that it is prepared to handle the business which it wishes to receive, it has issued two attractive folders, one containing a brief article describing the improvements which have been made, and the other bearing a map of the company's lines, telling what the company can give and why it should be supported by the people who are looking for the most satisfactory service.



home enterprise, spending our earnings with the merchants, as do our employes, thus keeping it in circulation at home where we all get a whack at it.

With these facts we come soliciting your patronage in our line, feeling that we are entitled to it. We can give you 425 city connections and promise you satisfactory service and courteous treatment.

Let us number you among our subscribers.

THE ROBERTS TELEPHONE AND ELECTRIC CO.

Interesting Advertisement of the "Show Me" Order Issued by a Texas Independent Company.

TELEPHONE STUDENTS AT PURDUE UNIVERSITY HOLD INTERESTING MEETING.

THE first meeting of the telephone section of the student branch of the A. I. E. E. at Purdue University, Lafayette, Ind., was held Tuesday evening, Oct. 2, 1906. Mr. O. C. Warner was elected chairman, with Mr. F. J. Strassner as secretary. The address of the evening was made by Mr. Fred L. Baer, of the Automatic Electric Co., of Chicago. In the course of his remarks he said that formerly the college man had a hard time getting a position. The manufacturer even discriminated against him and preferred the non-technical man. But now conditions have changed, and the technical graduate is sought out. The object of a college course is not to accumulate a fund of facts, but to learn how to learn; to train the ability to think out things alone; to recognize old things when they appear in new and unexpected forms. There is great value in the study of catalogues and pages of the trade papers. Text books are almost certain to be out of date as regards the forms of apparatus in current use. The fundamental principles do not change, but to keep up on the ever changing stream of improvements, the student must read the advertisements. In study, the student's object is not to show the professor that he knows certain things, but to convince himself that they are true. College credits will count nothing, for it is what he knows for himself that will help in practical work. One should not make the mistake of accepting the statements of great men as authority, but weigh their statements. Now, in school is the time to generalize, for when one gets into the work his time will be taken up in perfecting himself in his own particular line.

The talk was much appreciated by the students, who asked many questions at the close. Other prominent telephone men will address future meetings.

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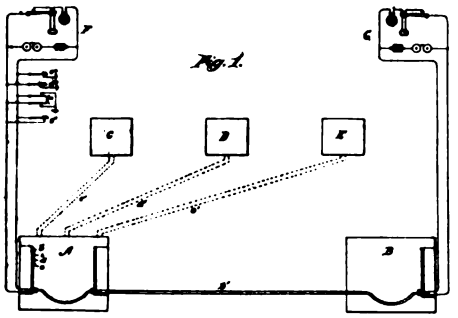
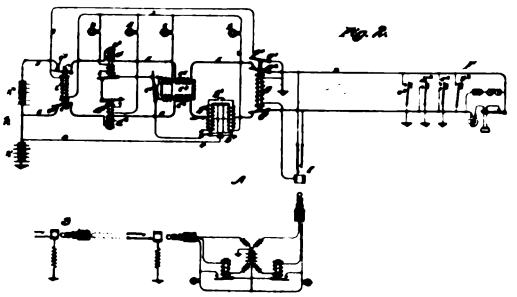
TELEPHONE PATENTS

SELECTIVE SIGNAL SYSTEM.

William W. Dean, Chicago, Ill., patents (No. 826,317; dated July 17, 1906; filed Jan. 14, 1902; serial No. 89,658) and assigns to Western Electric Company, Chicago, Ill., a selective signal system.



Referring to Fig. 1, there are shown two substations *F G* and a central office, comprising a number of switchboards *A B C D* connected by trunk lines. The operation of the system may be briefly described as follows: By consulting his directory the subscriber at *F* learns to which of the switchboards of station *G* the subscriber with whom he desires to speak is connected; for example, finding that it is switchboard *B*. He then depresses the corresponding key and actuates the relay b^3 of the set of four re-



lays b^1 c^3 d^3 e^3 (Fig. 2), each of which controls a signalling lamp. The operator is thus notified and connects his line to the corresponding trunk *b'*. The operator at *B* plugs in and after learning the desired number connects the trunk to *G*. In Fig. 2 are shown the circuits and relays by means of which the keys at substation *F* may be used to selectively operate the four lamps *b c d e* at the board *A*. Four cut off relays b^1 c^3 d^3 e^3 which have their armatures serially connected through their back contacts are provided for controlling the signal lamps. In this way each of the relay armatures when attracted cuts off all the armatures further on in the series. The relay b^3 responds only to positive currents from battery h^2 and the relay c^3 is of the consequent pole type.

SELECTIVE PARTY LINE SYSTEM.

Alfred O. Stigberg, Chicago, Ill., patents (No. 828,866; dated Aug. 14, 1906; filed May 6, 1904; serial No. 206,609) and assigns to Stromberg-Carlson Telephone Co., Rochester, N. Y., a party line telephone exchange system.

This is a four party line system which the inventor claims may be used with central energy or local battery systems. At each station there is an alternating current relay between one side of the line and ground and a polarized relay adapted for connection between the other side of the line and ground. The alternating current relay controls the circuits through the polarized relay, and the polarized relay upon energization serves to connect a bell in the signalling circuit. The selection of the polarized relay at the desired station is accomplished through the use of direct current of the proper polarity, under control of a master key at the central office, while the bells are rung by the alternating current, which actuates the alternating current relay, this being simultaneously impressed upon the line by the operations of the regular ringing key.

AUTOMATIC SYSTEM OF INTERCOMMUNICATION.

Anthony Van Wagenen, Sioux City, Iowa, patents (No. 833,429; dated Oct. 16, 1906; filed July 31, 1902; renewed March 3, 1906; serial No. 304,050) an automatic system of intercommunication.

This invention relates more particularly to automatic systems, but is also adapted for use in fire alarm systems, hotel signalling systems, etc. As description would take more space than we have at our disposal, we recommend that any one interested procure a copy of the specification.

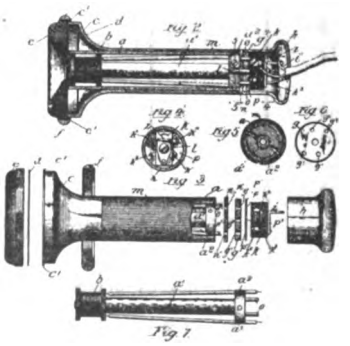
INDUCTIVE TRANSMISSION SYSTEM.

Isidor Kitsee, Philadelphia, Pa., patents (No. 828,217; dated Aug. 7, 1906; filed June 23, 1906; serial No. 323,065) a system for the electric transmission of intelligence.

To prevent inductive disturbances on a circuit which is run parallel to wires carrying heavy currents, the inventor provides an inductive arrangement of leads which may be briefly described as follows. Two wires are run from each end of the line to the place where the line begins to parallel the conductors carrying heavy current. At these points resistance coils are bridged across the wires. Throughout the region where inductive disturbances may be expected each side of the line is wound about the corresponding side of the line coming from the second station. There is no metallic connection between the two stations.

TELEPHONE RECEIVER.

Henry F. Albright, New York, N. Y., patents (No. 833,279; dated Oct. 16, 1906; filed Feb. 5, 1904; serial No. 192,180) and assigns to Western Electric Co., Chicago, Ill., a telephone receiver.



In this receiver the permanent magnet is tubular in form. The construction is best understood by reference to the illustrations. Fig. 2 is a longitudinal section, Fig. 3 shows the various parts of the receiver, Fig. 4 is a view on line 4 4 of Fig. 2, Fig. 5 is a section on line 5 5 of Fig. 2, Fig. 6 shows the disc to which the rear cap of the receiver is attached and Fig. 7 shows the core and coil of the magnet. The permanent magnet consists of an

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inner cylinder a^1 and an outer shell a, which are united at the rear by means of a soft iron disc a^2. A cup c, which supports the diaphragm, is fastened to the shell a. This cup is provided with a flange c^1, which engages with the internally threaded nut f. This nut is intended to be slipped over the receiver from the rear and to be screwed to the cap, e, of the receiver. At the rear of the tubular magnet a threaded disc g is provided, upon which a metal cap h is adapted to screw. A hard rubber shell m may be slipped over the receiver, but this forms no part of the structure of the receiver, so that troubles resulting from different expansions of the rubber and metal are avoided.

The inventor claims that the tubular form of magnet is preferable, as it will act more symmetrically on the diaphragm.

SELECTIVE SYSTEM.

Sylvanus Albert Reed, New York, N. Y., patents (No. 829,429; dated Aug. 28, 1906; filed March 13, 1903; serial No. 147,689) a selective system.

At each station there is provided a differential relay, with the neutral point of its winding connected to a common return. Between each terminal of the relay and the sides of the line are unequal resistances which have at each station a different ratio. At the exchange, in series with the common return, is the battery and a number of ringing keys corresponding to the various substations. These keys are so connected with resistances at the exchange that when any one of them is actuated all of the differential relays are unbalanced except one.

RECEIVER SUPPORT.

Frank F. Howe, Cleveland, Ohio, patents (No. 826,938; dated July 24, 1906; filed Jan. 23, 1906; serial No. 297,420) a telephone attachment.

This is a receiver support consisting of a horizontal arm which is adjustable so as to support the receiver in a convenient position for either the right or left ear. Normally, the receiver is held directly before the transmitter and, when displaced to either right or left, actuates the receiver hook which is of the usual form, but which is connected to the supporting arm by a linkage.

PARTY LINE SYSTEM.

Calvin R. Green and David R. Green, Rising Sun, Ind., patent (No. 823,215; dated June 12, 1906; filed Aug. 24, 1905; serial No. 275,645) a telephone system.

In this system the inventor provides at the substations a circuit controlling device which embodies a drum which actuates a number of circuit changing contacts. The revolution of the drum is controlled by a polarized armature, which is acted upon by three sets of electro-magnets, one of which is in series with the main line.

CONDUIT.

Albert S. Dixon, Los Angeles, Cal., patents (825,589; dated July 10, 1906; filed April 11, 1904; serial No. 202,654) and assigns to American Conduit Co., Los Angeles, Cal., a process of making hermetically sealed conduits.

This invention relates to a process of sealing sections of bituminized fiber conduit. Referring to Fig. 2, end 8 is inserted

Fig. 2.

in hot asphalt or bitumen and held there long enough to become thoroughly heated, slightly soft and coated with the liquid. The end 8 is then inserted in the section 9 and the inventor claims that the sections are thus firmly united and hermetically sealed.

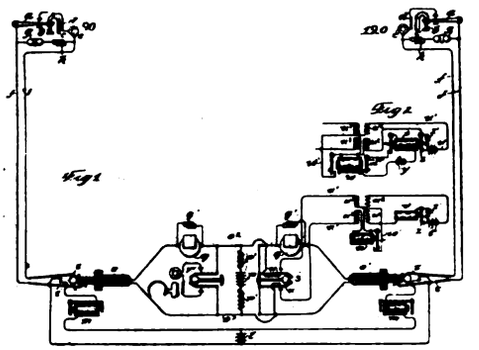
TRANSMITTER.

Stanley A. Duvall, Elkhart, Ind., patents (No. 833,449; dated Oct. 16, 1906; filed March 5, 1903; serial No. 146,310) a telephone transmitter.

The inventor provides a metallic auxiliary diaphragm which closes the front of the resistance chamber and is held in place by an annular nut. This diaphragm he makes of aluminum, preferably about one-thousandth of an inch thick. A bolt which is integral with the front electrode carries three nuts which clamp the two diaphragms firmly to the bolt and serves to transmit vibrations from the large diaphragm to the auxiliary diaphragm. The front electrode is made smaller than the one at the rear of the resistance chamber. The rear electrode is supported upon a stem threaded to engage with threads in the supporting member. This, in connection with the range of movement secured through fastening together the front and rear enclosing portions of the carbon-containing chamber, secures a wide range of adjustability.

TELEPHONE EXCHANGE SYSTEM.

Harry O. Rugh, Chicago, Ill., patents (No. 828,683; dated Aug. 14, 1906; filed Nov. 17, 1902; serial No. 131,697) a telephone exchange system.



In this system it is intended that the call bells at the subscribers' stations shall be actuated by alternating or by intermittent current, but no generator is employed at the exchange. Referring to Fig. 1 the usual line signals are shown at m and a clearing out signal at q. Two conductors u' connect the ringing key S with the apparatus for generating the ringing current. This consists of a battery, relays v and w and an induction coil. Normally the circuit through this ringing apparatus is open at key S. When this key is operated, current from battery t flows through the winding of the relay w actuating it. This causes current to pass through primary winding u^2 of the induction coil and to divide at relay w, part of it returning through the local primary circuit and part of it going through the winding of the relay, and after passing over the subscriber's line returning to the other pole of the battery. Relay v is constructed so that its armature vibrates and thus induces an alternating current in the secondary circuit. Relay w is made sluggish as compared to relay v, and is intended to retain its armature in an attracted position until the circuit is opened at the ringing key. Another form of apparatus is illustrated in Fig. 2. A magnet x is included in a local circuit with a battery y, the circuit illustrated being the well known make-and-break circuit, causing the armature of the electro-magnet to be constantly maintained in vibration.

PUSH BUTTON.

Frederick August Schneider, Toronto, Canada, patents (No. 825,488; dated July 10, 1906; filed March 21, 1905; serial No. 251,340) a push button.

The specification describes a push button which is intended to be used with the type of substation instrument in which the receiver and transmitter are mounted together on a handle. There is provided a hook on which the instrument is intended to hang when not in use and which serves to complete the signal receiving circuit. The push button mechanism is used to close the calling circuit.

TELEPHONE SYSTEM.

Paul Arnheim, Hamburg, Germany, patents (No. 832,443; dated Oct. 2, 1906; filed June 25, 1906; serial No. 113,143) and assigns to Telephon-Fabrik Actiengesellschaft, Vorm J. Berliner, Hanover, Germany, a telephone system.

The inventor describes a step by step party line system using alternating current. Each party line is connected to the exchange by two conductors, but it would appear from the specification that the various substations on the party line are connected by three or more conductors.

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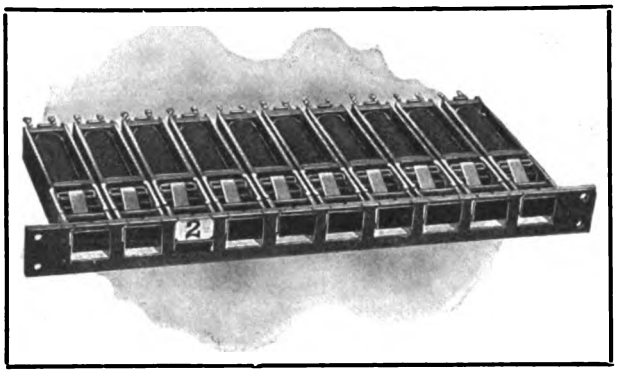
IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

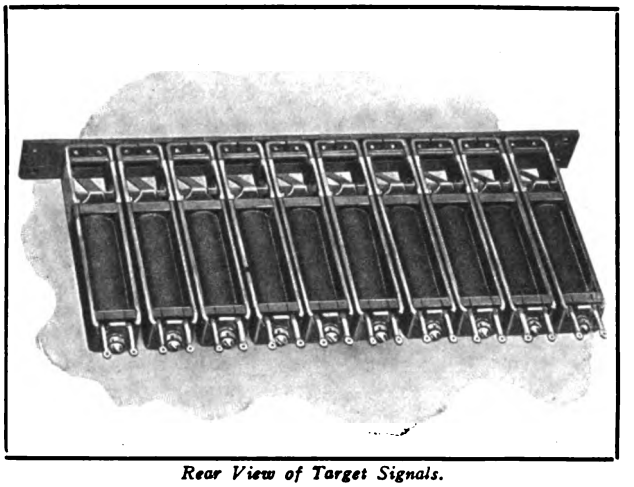
TRANSFER TRUNKS.

THERE are times when a telephone company is compelled to add to the switchboard equipment in a small central office, but for reasons of economy does not care to throw out the small boards which it is using and put in a new multiple switchboard. The installation of multiple jacks in the small boards is probably not to be thought of on account of their design, or in any event on account of the expense. Under such conditions, the most economical way of providing for the new business is to install another single position switchboard and use transfer trunks between it and the old positions.



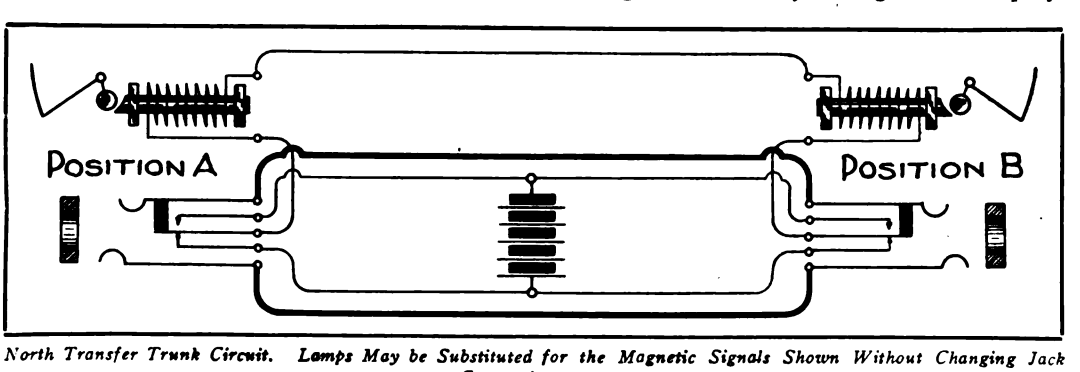
Front View of Target Signals Used with North Transfer Trunks.

The North Electric Company, Cleveland, Ohio, has designed circuits and apparatus which are said to give most excellent satisfaction in connection with this method of giving service. For signals, either automatic target signals or lamps may be used, the connections and operation of the circuit being the same in either case. When a call is received for a line terminating in a jack before a distant operator, the operator who receives the call depresses an order wire key which connects her telephone set with that of the operator at whose position the requested subscriber's line terminates. The first operator repeats the subscriber's number called for, assigns by number a disengaged transfer trunk and places her calling plug in the assigned trunk jack at her position. By so doing she lights the lamps, or causes to be displayed the targets, associated with both ends of the trunk. When the second operator inserts her answering plug in the jack to which her end of the trunk is connected it will be seen that both signals return to the idle condition. She then inserts the calling plug in the requested subscriber's line jack, thus completing the circuit, and rings in the usual way.



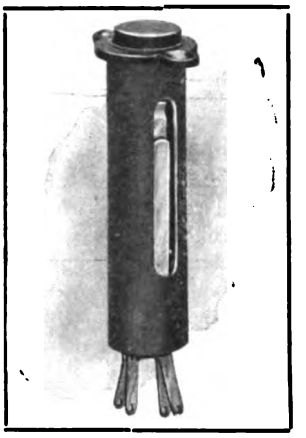
Rear View of Target Signals.

As soon as the conversation is completed the first operator should be advised of the fact by the falling of her clearing out drop. She then removes the plugs and as soon as the jack of the transfer trunk is clear the springs return to the condition indicated in the diagram. Since the jack at the remote end still contains a plug the negative side of the battery is in connection with the signal circuit at this end of the trunk. This causes both of the signals to be displayed a second time, warning the operator at the distant end of the circuit that the connection should be taken down.



North Transfer Trunk Circuit. Lamps May be Substituted for the Magnetic Signals Shown Without Changing Jack Connections.

THE CENTURY CONSTRUCTION COMPANY, 332 Ellicott street, Buffalo, N. Y., has just issued a new bulletin illustrated with some very interesting views of its No. 85 desk stand. They show very clearly the attractive appearance of the instrument, and its extremely simple construction. The transmitter is supported upon a standard of special form, contained within a divided pedestal case made of two pieces of pressed brass, fitted together so as to match perfectly. These are securely held in place by a knurled ring, placed immediately above the hook switch. By loosening this ring the pedestal case can be removed at an instant's notice, leaving the hook switch and its connections fully exposed. The company will be pleased to send these folders to interested persons.



North Order Wire Key.

JULIUS ANDRAE & SONS CO., Milwaukee, Wis., have recently issued a new catalogue. It has been aptly characterized as "A telephone encyclopedia," describing everything from an ammeter to a zinc battery. The book, which is profusely illustrated, would be a valuable addition to the library of every telephone man. It may be obtained by writing to the company for Catalogue No. 24.

THE LEEDS & NORTHRUP CO., 4901 Stenton avenue, Philadelphia, Pa., is sending out a folder describing some of the advantages of the L. & N. Decade Portable Testing Sets. Among these are enumerated the following: The rheostat has a single plug for each row of resistances which makes it very convenient to manipulate and has the very decided

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With GRAY AUTOMATICS quick service by simply dropping a coin in the slot the operator receives a quick and distinct signal

With LEVER STATIONS slow service the operator gets the straining and snapping of Springs, the slamming of Levers and the suction of Air Pumps

GRAY TEL. PAY STA. CO. HARTFORD, CONN.

YOUR ADDRESS WANTED.

FOR SALE

For Telephone Plants, Telephone Apparatus and Switchboards for sale by Operating Telephone Companies only. Four cents per word for each insertion. Minimum charge $1.00. Prepaid.

FOR SALE—Telephone exchange, Central Kansas; about 500 subscribers; city of 1,700; no competition; Central Energy; 65 miles toll lines; system practically new within two years; no farmer troubles; fair rates. Address Box 716, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 716

FOR SALE—Telephone exchange and electric light plant in rapidly growing new town in South, with over 2,500 inhabitants; exclusive franchises on both, one for 50 years and one 99 years, dating from 1905; two properties earned over 15 per cent net first year; will sell cheap, as owners need money in lumber business. Address Box 714, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 714

FOR SALE—Half interest in telephone exchange, to party who can take hold as manager; salary $60.00 per month; will take $3,500. For further information address Box 64, Kaw, Okla. 712

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

WANTED—Whirlwind salesmen. Men who are resourceful, energetic and capable of commanding large salaries; the kind of men who are not accustomed to take "No" or "We will give you an order the next time you are here" for an answer. For such men we have good positions. We are willing that our salesmen should participate in the profit outside of the question of salary. Apply by letter or in person. Address S. A. Duvall, superintendent Long Distance Telephone Mfg. Co., South Bend, Indiana. 694

THE Dean Electric Company, Elyria, Ohio, is constantly increasing its works, and always on the lookout for first-class young men, experienced in either factory or outside installation work. Make application by letter, stating age, experience, etc. Address Supt., The Dean Electric Company, Elyria, Ohio. 699

WANTED—Man to represent us in the State of West Virginia and surrounding states. One who is thoroughly acquainted with the Independent telephone movement in the state of West Virginia. Would prefer a man who has some knowledge of the telephone business and has influential friends throughout the state. Apply by letter or in person. Address, S. A. Duvall, superintendent, Long Distance Telephone Mfg. Co., South Bend, Indiana. 695

POSITION WANTED—As Assistant Manager or Superintendent of telephone exchange of two to eight hundred subscribers. Six years' experience, good habits and can give best of reference. Address Box 717, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 717

WANTED—Position as engineer or manager by a technical graduate. Seven years' experience. Good references. Address Box 701, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 701

WANTED—Position by man and wife to take charge of telephone system. Man, technical education, seven years' practical experience in construction and management of local or common battery plants. Wife, five years' practical experience in operating and accounting. At present man employed as manager, wife as chief operator and accountant. Desire healthful location in Northwest States. Address Box 707, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 707

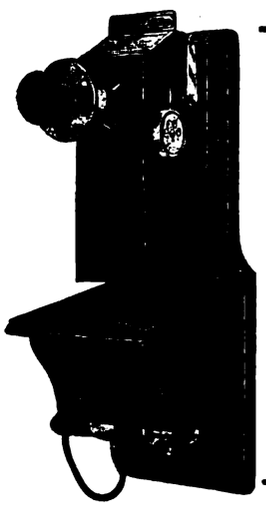
WANTED—A position as manager of a magneto exchange, from 500 to 1,000; good reference; five years' experience. Address G. H. Myers, No. Adams, Mich. 709

WANTED—Position as contract agent or in the auditing department; capable of installing accounting system; South preferred. Address Warren F. Jaques, Hawley, Minn. 710

WANTED—An experienced wire chief, one capable of making cable tests. Address Box 711, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 711

WANTED—Position by man having switchboard engineering experience; capable to take charge of maintenance or construction, either switchboard or line; can furnish best of reference. Address Box 713, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 713

WILL pay $60.00 month for a telephone cable test man who understands business and can handle his work without working a bluff to hold his job. Address Box 715, care THE AMERICAN TELEPHONE JOURNAL. 100 William street, New York. 715



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ONE WOULDN'T RING A BELL THAT WAY

Baird Cash Register Pay Stations Give Clear, Loud Signals

BECAUSE

THEY HAVE LEVERS AND SPRINGS

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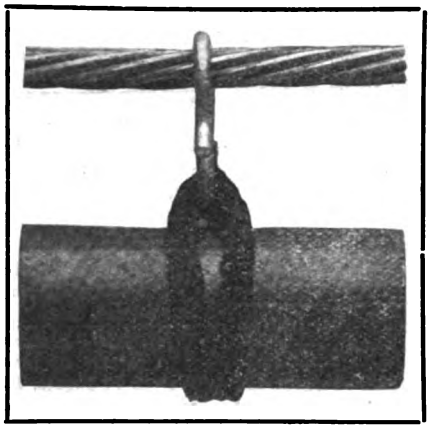
advantage that the resistance is read off directly from the position of the plugs. The rheostat blocks are in pairs and each pair is mechanically independent of the other blocks. There is consequently no danger that a plug contact will be loosened by removing a plug near it. The set is so arranged as to give ample distance between the rows, so that there is no trouble in manipulating the plugs even when the operator's hands become benumbed by cold or he has to wear gloves. Connections for fault tests are quickly made. Binding posts are provided for outside battery and galvanometer, thus providing for the possibility of using more battery in case of very high resistance faults. The set contains the L. & N. sensitive galvanometer and sufficient battery for all ordinary requirements. Ratio coils are arranged on the "plug in" plan and are reversible without changing the formula $X = \frac{a}{b} R$, a very important advantage, as in the L. & N. Decade Portable Testing set the unknown resistance is always $\frac{a}{b} R$.

Accompanying the folder are copies of letters from some of the most successful manufacturers and operating companies in the country, each of which is a very strong recommendation based upon experience with the set in practical use. The company will be pleased to send further information to all persons having occasion to use high grade testing apparatus.

MARLIN CABLE HANGERS.

An increase of one-third over the sales for the corresponding period of last year is the record made on marlin cable hangers by the National Telephone Supply Company of Cleveland, O. This makes the present year the best in the existence of the company since it has commenced the manufacture of the marlin cable hangers.



Section of Cable Supported by the National Telephone Supply Company Marlin Hanger.

The large increase in the company's business is ascribed to the fact that it has always used the best grade of material in the manufacture of its hangers. The houseline used is all long line pure American hemp. Experience has shown that this will outlast by several years the ordinary grades of marlin and houseline which are on the market. The hooks are carefully formed, and are re-galvanized by the hot dip process. The galvanizing is guaranteed by the company to stand the test by four immersions.

At the present time construction men are strongly disposed to use the best grade of material obtainable. The National Telephone Supply Company has been for a long time engaged in the manufacture of cable hangers, and its wide experience and manufacturing skill has enabled it to produce an article of the highest grade at a comparatively low cost. The company will be pleased to furnish details upon receipt of inquiries.

Machado & Roller, 203 Broadway, New York, have just sent out a new catalogue of the instruments manufactured by the Whitney Electrical Instrument Co. This catalogue illustrates in detail the mechanism of the instruments and describes and illustrates the various types of volt and ammeters and special testing sets. Among the latter may be mentioned a bridge of the Decade type, a special resistance gauge designed for measuring resistances in places where the ordinary rough method of testing with a magneto is usually employed, and two types of ohmmeter. The pocket instruments manufactured by this company have some features very attractive to telephone men. Both voltmeters and ammeters of attractive appearance are made so small in size that they can be readily slipped into a pocket like a watch. The catalogue or any further information desired can be obtained by writing to Machado & Roller, who are general sales agents for the Whitney Electrical Instrument Co.

PRACTICAL DEMONSTRATIONS FOR PARTY LINE CONDENSERS.

Many managers of rural telephone lines are testing Andrae condensers as a means of avoiding annoyance from the prevention of ringing, through the "listening in" of subscribers, by having the condensers put in actual operation. The Julius Andrae & Sons Company, of Milwaukee, makers of Andrae condensers, equip party lines free of charge for a period of time long enough to insure a thorough trial. Messrs. Andrae & Sons attribute their large sales in this line to the fact that the Andrae condenser is extremely simple, positive, and does not decrease the efficiency of the talking in the slightest degree.

The Electrical Trades Exposition Company, 139 Adams street, Chicago, Ill., announces that only a limited number of spaces for the 1907 Electrical Show which is to be held at the Coliseum, Chicago, Jan. 14th to 26th, inclusive, are still open. These will be sold in the order of receipt of applications. In view of the great success of the exhibition of telephone apparatus last year, the company is especially anxious to have this branch of the electric industry well represented, and will be glad to receive applications from manufacturers of this class of goods as early as possible in order that they may be assigned the best locations available.

GERMAN MANUFACTURERS MAKE A TOUR OF THE COUNTRY.

A DELEGATION representing the firm of Mix & Genest, manufacturers of telephone and telegraph apparatus, of Berlin, Germany, is visiting this country for the purpose of studying the practice prevailing in telephone exchanges and becoming familiar with American manufacturing and business methods. This group of men includes some of the highest officers of the firm, among whom are Dr. R. Franke, a director of the company; F. Mueller, manager of the works; and M. Gardonyi, engineer, and representative of the company in London. New York, Boston, Chicago, Rochester, Dayton, Cleveland and other important cities have already been visited.

The foreign scientists have taken a great deal of interest in the rapid progress of the telephone art, and particularly in the up-to-date methods of various Independent telephone manufacturers whose plants they have seen. Upon the return of these gentlemn to Europe the firm of Mix & Genest intends to build an addition to its present large plant in Berlin, and the results of the broad studies carried on in this country on the present trip are expected to have considerable influence upon telephone development abroad within a short time.

F. B. Patten, who has for some time been connected with the American Electric Fuse Company, of Muskegon, Mich., has recently severed his connection with that firm. On November 1st he joined the organization of the Rolfe Electric Company, Rochester, N. Y., manufacturers of fuse boxes and electrical specialties. Mr. Patten is now general manager of the latter company.

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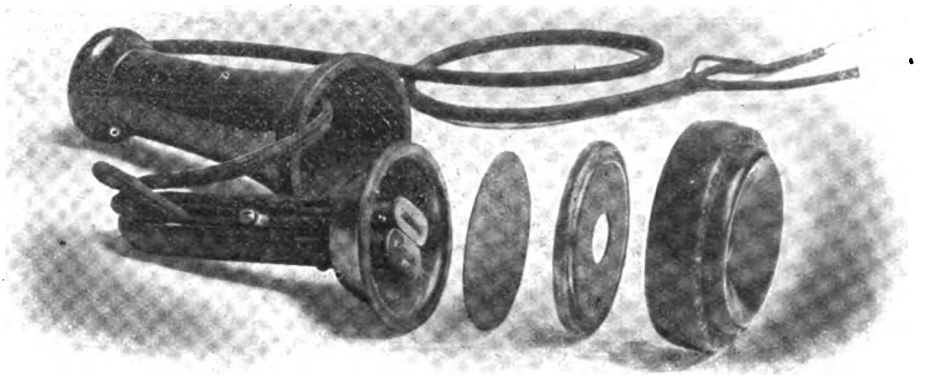

The Sumter "Indestructible" No. 48 Receiver

METAL CASE ENCLOSED DIAPHRAGM TYPE
HARD RUBBER SHELL
EXTRA HEAVY CAP
INSTANTLY REMOVABLE SPOOLS
POSITIVE PERMANENT ADJUSTMENT
USES CORD WITH ANY STYLE TIPS
CAREFULLY ASSEMBLED
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Get Our Bulletin "Forty Eight"

The Sumter Telephone Manufacturing Co.
SUMTER, S. C.

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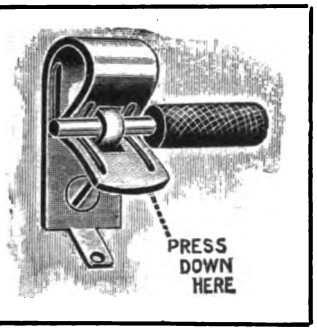

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For Timing All Toll Messages, Use

IT PRINTS:

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(a) The Time of Day
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on the toll ticket, ready to file. You can determine the overtime charge exactly.

It Makes No Clerical Errors.

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THE WEEK'S MESSAGES

NEW COMPANIES.

REDDING, CAL.—The Pacheco Telephone Company has been organized by a number of farmers living on Churn Creek in the Pacheco neighborhood, thirteen miles from Redding, and has elected the following officers: President, D. W. Hampton; secretary, W. J. B. Martin; treasurer, W. H. Hill. It is the intention of the company to build a telephone line to connect with Redding.

MACON, GA.—The Parker Constructing Company, whose intention it is to build and own telephone and telegraph lines in the city of Macon, has been incorporated with a capital stock of $50,000. The incorporators are T. C. Parker, T. M. Wheless, J. W. Markham and T. B. West.

ROME, GA.—Plans for the establishment of an Independent telephone system in Rome are under way. Among those interested in this enterprise are A. L. Harlow, of Detroit, Mich.; John H. Reynolds, president of the First National Bank of Rome, and Hugh Reynolds, cashier of the Citizens' Bank. The proposed plan is for five hundred patrons to subscribe each for $200 worth of stock, $50 to be paid down and the balance in instalments running through five years. At the expiration of that time the subscribers will own the system. Mr. Harlow expresses his belief that a system can be installed for $50,000, leaving a balance of $50,000 in the treasury as a working fund. Application for a franchise is to be made.

MUDLICK, KY.—Articles of incorporation have been filed by the Monroe Fraternal Telephone Company, of Mudlick, Ky.

PATTEN, ME.—Articles of incorporation have been filed by the Patten & Trout Brook Telephone Company, of Patten, Me. It is its intention to construct, maintain and operate telephone lines at Patten and Trout Brook and all intermediate points. The capital stock of the new company is $2,500, all paid in, and the officers are as follows: President, B. W. Howe, of Patten; treasurer, W. Scott Kellogg, of Patten.

GOLDEN HILL, MD.—Articles of incorporation have been filed by the Golden Hill Telephone Company. The capital stock is placed at $2,500, divided into 100 shares of the par value of $25 each, and the incorporators are W. F. Applegarth, Charles R. Mills, Henry I. Phillips, George W. Tyler, John M. Clayton, Alonzo Travers, Oscar A. Keene, John S. Bozman and B. F. Travers. It is the intention of the company to construct and operate a telephone system through Hooper's Island and to points in Dorchester county. The principal office is to be at Golden Hill.

RED LODGE, MONT.—At a recent meeting of the citizens of Red Lodge it was voted that the city should build and own a municipal telephone line, and B. P. Moss has been named as president of the new company.

CORTLAND, NEB.—The Cortland Telephone Company, Cortland, Neb., has been incorporated with the following incorporators: Harry Tweedy, E. E. Adkes, J. F. Bunte, J. A. Johnston, William Rohe, Henry Pothast and B. Deming. The capital stock of the company is $2,240, divided into sixty-four shares of $35 each.

UNADILLA, NEB.—The Farmers' Mutual Telephone Company has been incorporated with a capital stock of $5,000. The incorporators are G. C. Gilbert, J. M. Morgan, Thomas Rodaway, John Riege and L. H. Judkins.

MORRISTOWN, N. J.—The Yamatine Manufacturing Company, 48 Water street, Morristown, N. J., has been incorporated with a capital stock of $750,000. It is its intention, among other things, to construct telephone lines. The incorporators are George R. DeMontlord, John H. Rosevear and Edward A. Quayle, of Morristown, N. J.

TROY, N. Y.—The New York and Vermont Telephone Company, Troy, N. Y., has filed articles of incorporation, and proposes to operate telephone lines in Rensselaer, Warren, Saratoga, Washington and Essex counties. It has a capital stock of $100,000, and the directors are W. Levis Burk, W. C. Colburn, Jas. H. Caldwell, I. S. Freeman, Wm. Connors, Troy; Clarence E. Parker, H. J. Stevens, Floyd E. Cole, Granville, and W. L. Hitchcock, Cambridge.

STOCKPORT, OHIO.—Articles of incorporation have been filed by the Morgan County Farmers' Telephone Company, of Stockport, Ohio. The capital stock is placed at $5,000, and the incorporators are C. D. Mosher, V. Nott, F. Nott, A. Mercer, M. D. Harris and others.

PAISLEY, OREGON.—Articles of incorporation have been filed by the Moss Telephone Company. The company has an authorized capital stock of $3,000, and the incorporators are as follows: Harry Bailey, Dick J. Wilcox, B. Reynolds.

PIERRE, S. D.—Articles of incorporation have been filed at Pierre, S. D., by the Pleasant View Telephone Company. The company will construct rural lines in Lincoln township, Lincoln county. It is capitalized at $1,200, and the incorporators are Homer Denure, J. F. Hunt and Otto Johnson, of Lincoln township.

VALLEY SPRINGS, S. D.—The Beaver Bend Telephone Company, of Valley Springs, Minnehaha county, S. D., has filed articles of incorporation, placing its capital stock at $1,000. Among the incorporators are J. H. Johnson, Ferdinand Larson, H. C. McGilvery and August Anderson.

JAMESTOWN, TENN.—The Jamestown Telephone Company has been incorporated by the following incorporators: W. S. Knight, A. D. Wooldridge, W. O. Grider.

CLEVELAND, TEXAS.—A company with twenty-one stockholders, to be known as the Cleveland Telephone Company, has been organized here. The company starts with a capital stock of $1,000, of which $500 has been paid in, and expects to apply for a charter and at once commence work on a telephone system for Cleveland and vicinity. The officers of the company are J. T. Tanner, president and general manager; R. W. Jeffers, secretary; T. A. Boothe, treasurer. Directors: C. N. Smith, F. Dorst, Noble Garvey and M. W. Harrell.

WAXAHACHIE, TEX.—The Farmers' Telephone Company, of Waxahachie, Tex., has been incorporated with a capital stock of $8,000. It is its intention to construct telephone lines in Ellis, Dallas, Kaufman, Hill, Navarro, Johnson and Tarrant counties. The incorporators of the new company are J. D. Nelson, W. A. Culbertson, G. S. Keesee and G. A. Butcher.

HANSONVILLE, VA.—The Homer and Lebanon Telephone Company has been incorporated with an authorized capital stock of $2,000.

EDGAR, WIS.—The Edgar Local Telephone Company, of Edgar, Marathon county, Wis., has been incorporated with a capital stock of $2,000. The incorporators are C. C. Barrett, A. W. Puchner and A. J. Cherney.

YORKTON, SASK., CANADA.—The rate payers of Yorkton, Sask., Can., have voted $90,000, a portion of which will be used to equip and operate a municipal telephone system in Yorkton. Address S. N. Wynn.

FRANCHISES.

LAMAR, COL.—Application for a franchise at Lamar, Col., has been made by the Transcontinental Telephone Company.

BELLEVILLE, ILL.—The Looking Glass Prairie Telephone Company has applied for a franchise at Belleville, Ill.

VALPARAISO, IND.—The Portage Home Telephone Company has applied for a franchise to operate a telephone system in Valparaiso.

WICHITA, KAS.—The city council is to consider the advisability of granting a franchise to the Independent Telephone Company.

LIBERTY, MO.—The city council has granted a telephone franchise to the Clay County Telephone Company.

ASHEVILLE, N. C.—Permission has been granted the Union National Telephone Association of Western North Carolina to construct lines along any or all of the county roads. The company has a charter now pending.

FARGO, N. D.—The Tri-State Telephone Company has asked the Council of the City of Fargo for a franchise to install a station for toll work.

COLUMBUS GROVE, O.—The Farmers' Mutual Telephone Company has been granted a telephone franchise at Columbus Grove, and will shortly establish an exchange at that point.

CASTLE DALE, UTAH.—Application is being made by C. O. Harris, in the interests of B. F. Kierullf, Jr., & Company, of San Francisco, for a telephone franchise at Castle Dale, Utah. Franchises are also being requested in a number of other towns in the county.

RUTLAND, VT.—The Common Council, of Rutland, Vt., by a vote of eight to three has passed over the Mayor's veto and granted a franchise to the Home Telephone Company, of Albany, N. Y.

ABERDEEN, WASH.—A franchise to construct an Independent telephone system at Aberdeen has been granted to E. C. Finch. Work on the plant will probably be commenced very soon.

RENTON, WASH.—The Independent Telephone Company has been granted a franchise at Renton and will connect with the Citizens' Telephone Company of Rainier Valley.

REVELSTOKE, B. C., CAN.—Messrs. Harvey, McCarter and Pinkham, attorneys, are applying for the incorporation of a railway company, with the privilege of building telephone lines along the route.

LINDSAY, ONT., CAN.—The twenty-one year franchise recently applied for by the Canadian Machine Telephone Company has been granted. The company already has a system installed in Peterborough and one in the course of installation in Brantford.

FINANCIAL.

ATWOOD, ILL.—The Atwood Telephone Company has increased its capital stock to $12,000.

NEW BEDFORD, MASS.—The Automatic Telephone Company, of New Bedford, expects to increase its capital stock from $100,000 to $150,000 or $200,000.

ST. PETER, MINN.—The stockholders of the Cannon Valley Telephone Company at a recent meeting voted to increase the capital stock of the company from $50,000 to $100,000. The company operates exchanges at Waterville, Montgomery, Le Sueur Center, Elysian and Janesville.

LIVINGSTON, MONT.—The capital stock of the Livingston Home Telephone Company, Livingston, Mont., recently organized, is $60,000, of which $30,000 has actually been subscribed.

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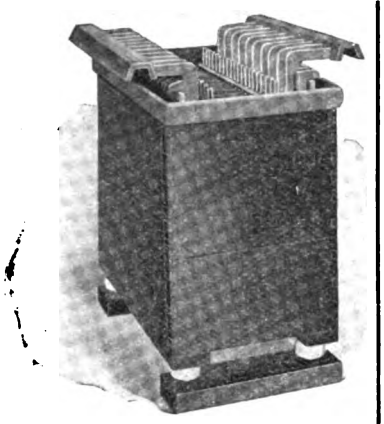

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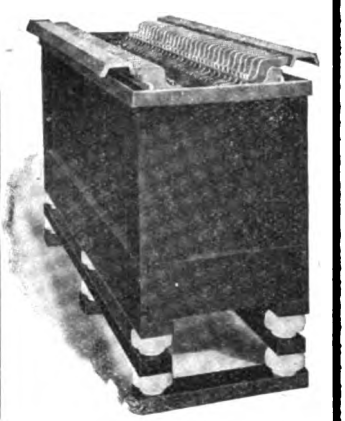

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John Wanamaker says: "If there is one enterprise on earth that a 'quitter' should leave severely alone, it is advertising. To make a success of advertising one must be prepared to stick to it like a barnacle on a boat's bottom. He should know before he begins it that he must spend money—lots of it. Somebody must tell him, also, that he cannot hope to reap results commensurate with his expenditure early in the game. Advertising doesn't jerk: it pulls. It begins very gently at first, but the pull is steady. It increases day by day and year by year until it exerts an irresistible power."

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THE WEEK'S MESSAGES

SENATH, MO.—The capital stock of the Senath Telephone Company has been increased from $1,500 to $6,000.

BIG SPRINGS, TEXAS.—The Western Telephone Company, of Big Springs, Texas, has amended its charter, increasing its capital stock from $60,000 to $120,000.

COMBINATIONS.

GAINES, MICH.—The Union and Mutual telephone exchanges in the city of Gaines have been consolidated, and a much improved service is promised the subscribers.

EVERMAN, TEXAS.—Messrs. J. Martin Scott and J. Luther Gantt have purchased from J. W. Hudson the telephone system at Everman, Tarrant County, the purchase price being $2,000.

SACKVILLE, N. B., CAN.—The town council has made arrangements to take over and operate the plant of the Sackville Electric Light & Telephone Company.

ELECTIONS.

HARMON, ILL.—The following officers have been elected by the Green River Telephone Company, recently incorporated: President, Elmer Cotton; secretary, Benjamin F. Swab; secretary, W. H. Kugler.

PERSONAL.

R. C. MARDEN has been appointed superintendent of the Fitchburg division of the New England Telephone and Telegraph Company.

T. J. WHITNEY has been made acting district manager for the Fargo district of the Northwestern Telephone Company.

New Construction in the Field

ORANGE, CAL.—The lines of the Home Telephone and Telegraph Company, which have been extended in Orange, are also to be extended in Anaheim, Tustin, Fullerton, Olive, Buena Park and all other towns of the county.

PITTSFIELD, ILL.—A new switchboard has been installed at Pittsfield by the Pike County Telephone Company to take care of its increased business.

QUINCY, ILL.—The Home Telephone Company is extending its lines in Quincy.

WESTFIELD, ILL.—The Farmers' Mutual Telephone Company expects to construct a telephone line between Westfield and Martinsville. The company has also obtained possession of the Hammond and Best telephone line which runs from Cleone to Martinsville.

COLUMBUS, IND.—Many improvements are to be made in the service of the Citizens' Telephone Company at Columbus, Ind.

SARATOGA, IND.—The Eastern Indiana Telephone Company is constructing new lines in the White River Chapel district.

LEWIS, IA.—Among the many improvements planned by the Lewis Telephone Company, at Lewis, Ia., is the installation of a new switchboard.

RIVERTON, IA.—New lines are being built by the Independent Telephone Company at Riverton, Ia.

SHENANDOAH, IA.—Many improvements are to be made in the system of the Mutual Telephone Company, which will make the plant strictly up-to-date.

KINGMAN, KAN.—The plant of the Kingman Telephone Company is being rebuilt.

FORT FAIRFIELD, ME.—The Independent Telephone Company of Aroostook is constructing a telephone system at Fort Fairfield, at which point it will establish an exchange. An exchange has also been installed at Ashland and new lines are being built in the direction of Houlton.

PORTLAND, ME.—Many improvements are to be made in the system of the Automatic Telephone Company at Portland, Me.

PRESCOTT, MASS.—Lines are being constructed by the Highland Telephone Company in Prescott.

SEEKONK, MASS.—A new farmers' telephone line is being constructed from Seekonk Four Corners to Egremont Plain.

SAGINAW, MICH.—The Valley Telephone Company, of Saginaw, contemplates extending its lines through Spaulding township.

NEW ULM, MINN.—The lines of the New Ulm Telephone Company have been extended to Hanski.

RAPIDAN, MINN.—The Mankato Citizens' Telephone Company is making preparations to construct a number of farmers' lines to Rapidan.

ST. PETER, MINN.—It is the intention of the Cannon Valley Telephone Company to spend in the neighborhood of $20,000 in extending its lines.

FULTON, MO.—Among the many improvements to be made by the Buffum Telephone Company at Fulton, upon which $100,000 will be spent, is the installation of a new switchboard. It is the company's intention later to rewire the entire city, and thoroughly overhaul the present exchange. The latter improvements, it is estimated, will cost in the neighborhood of $25,000.

LINN CREEK, MO.—A new telephone line from Linn Creek to Purvis, with Versailles connections, is to be constructed by Messrs. Sam Moss and Charles Towns, of Purvis.

OTTERVILLE, MO.—The O. & S. Telephone Company is constructing a line from Syracuse to Otterville.

RICH HILL, MO.—The telephone lines of Mr. Rhineheimer are being extended in Rich Hill and additional lines are to be constructed to Butler.

DE WITT, NEB.—The De Witt Telephone Company is planning to build several rural lines in the near future.

SALEM, N. Y.—Improvements are being made in the system of the Granville Telephone Company at Salem.

SODUS, N. Y.—New lines are being built by the Wayne-Monroe Telephone Company at Sodus.

PEEKSKILL, N. Y.—The State Line Telephone Company contemplates the erection of a line from Peekskill to Verplanck.

HERMISTON, OREGON.—The Butter Creek Telephone Company, of Pendleton, is planning to build a line to Hermiston.

MAINVILLE, PA.—The people of Mainville have made an agreement with the United Telephone Company for a telephone line through that section, to connect Beaver Valley, Hetlerville and other points.

NORTHEAST, PA.—It is the intention of the Mutual Benefit Telephone Company to rebuild and greatly improve its system.

HOPKINTON, R. I.—The lines of the Westerly Automatic Telephone Company are to be extended to Hopkinton and Ashaway.

BROWNSVILLE, TEXAS.—As soon as the right of way along the St. Louis, Brownsville and Mexico Railway can be secured by the Brownsville Telephone Company, lines will be built from Brownsville to Robstown, and from Harlingen to Lonsboro.

PETERSBURG, VA.—Ten thousand dollars worth of new overhead cable will be one of the features of the Petersburg Telephone Company's complete renewal of equipment. The new exchange building for the company has been completed and the switchboard and other apparatus will shortly be installed.

SPOKANE, WASH.—The Interstate Telephone Company is constructing a line from Post Falls to Spokane.

UNDERGROUND.

LAFAYETTE, IND.—It is the intention of the Lafayette Telephone Company to expend $18,000 in conduits to take the place of wires which are now overhead.

MARSHALLTOWN, IOWA.—The Central Telephone Company expects to place its wires underground in Marshalltown. The company also expects to place all its wires on the main leads in Rockwell City, Ia., in conduits.

WAVERLY, IOWA.—Permission has been granted to the Corn Belt Telephone Company to place its wires underground in Waverly.

TOPEKA, KAN.—The Independent Telephone Company is placing many of its wires underground in Topeka.

LOWELL, MASS.—The Merrimac Valley Independent Telephone Company expects to do considerable conduit work in Lowell.

FULTON, N. Y.—The Oswego County Independent Telephone Company, recently organized and which is to install a plant at Fulton, is to place all of its wires and cables underground in the business sections of Fulton.

COLUMBUS, O.—Application has been made by the Citizens' Telephone Company for permission to place certain of its wires underground in Columbus.

YOUNGSTOWN, O.—An ordinance has been passed requiring the Youngstown Telephone Company to place its wires underground in some of the streets in Youngstown.

WILKES-BARRE, PA.—An ordinance calling for all wires to be placed underground throughout the city of Wilkes-Barre will be introduced at the next meeting of councils. While this motion was denied some time since, there is every reason to believe that the measure will be passed this time, at least so far as the business portion of the city is concerned.

CLARKSVILLE, TENN.—An ordinance is before the city council requiring all telephone wires in the central part of the city to be placed underground.

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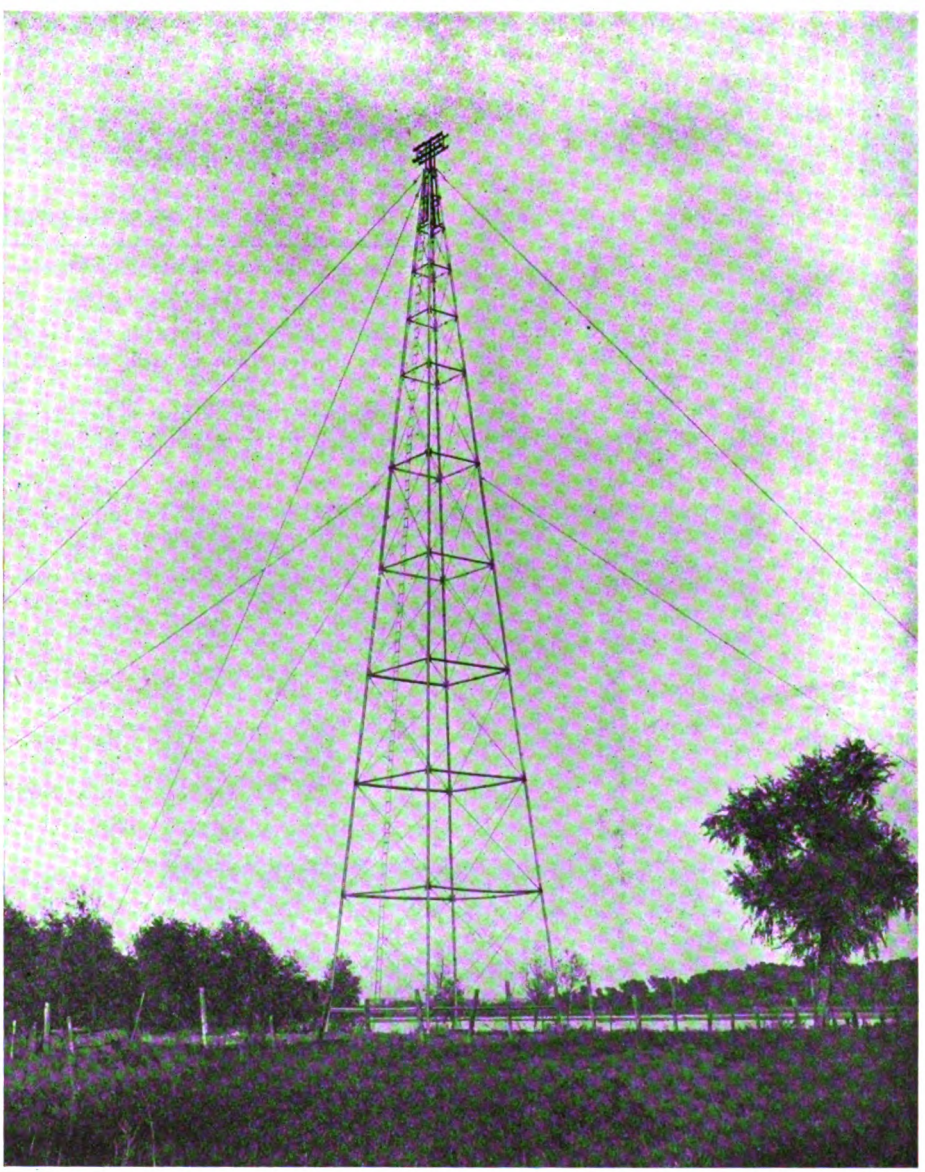
The River Crossing at Council Bluffs

By J. A. Leonard.

ALTHOUGH the Independents will soon be operating in Omaha, Nebraska, this city has for a long time been distinguished from its neighbors as the only one where the Independents are not competing for the telephone business. In Lincoln the Home Telephone Company is pushing the Bell hard for the city service, while the toll service from there to surrounding territory is increasing rapidly. Across the river from Omaha the Independent Telephone Company of Council Bluffs, Iowa, has had toll connections with southwestern Iowa ever since its plant was first put in operation last spring.

Up to the first of October connection between southwestern Iowa and southeastern Nebraska was impossible, and would probably have been so for some time had it been necessary to cross the river on either of the three bridges which span it at Omaha, for as soon as the Nebraska side of the bridge was reached there would be no way of obtaining a right of way through Omaha.



Steel Tower Erected by the Independent Telephone Company of Council Bluffs to Support Wires Above the Missouri River.

As the farmers in the territory around Council Bluffs are mostly cattle feeders, it was necessary to get telephone connection with South Omaha, as well as other towns in Nebraska, in order that the telephone company could furnish these feeders with service to a reliable source from which market reports could be obtained. To do this the Independent Telephone Company of Council Bluffs ran two copper circuits from its office to a point on the river opposite South Omaha and across the river by means of a river span eighteen hundred and seventy feet in length, where it was connected to the lines of the Plattsmouth Telephone Company, which operates an Independent system in South Omaha.

As the river bank on both the Iowa and the Nebraska sides is low at this point it was necessary to erect a steel tower on each side of the river. These towers are of galvanized iron, and are one hundred and ten feet tall, twenty-four feet square at the base and taper to fifteen inches at the top. They are constructed of three inch double angle iron, with cross braces of five-eighths inch iron rods. Each tower is capable of supporting a down-strain of twenty tons. The tops of the towers are re-inforced with four three-inch angle irons twelve feet long, which extend four feet above the tower proper. On these four irons are fastened four angle iron cross arms, two at the top of the re-enforcement and two twenty inches below, so as to be equivalent to two double

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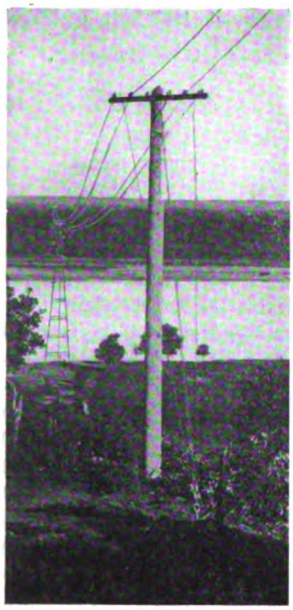
cross arms twenty inches apart. Each arm is equipped with six porcelain shieves so arranged as to turn and allow the wire to run freely back and forth over the top of the tower.

Back about seven hundred feet from the towers heavy stubs were set. Each stub was set in concrete and anchored with two three-eighths inch messengers to a slug, also set in concrete. The necessity for these heavy anchors will be clear to one who examines carefully the illustration showing the stub on the Nebraska side. This is on a bank at least as high as the tower, so that while the tower bears a comparatively small portion of the pull of the wires, a very heavy bending stress is put upon the stub.

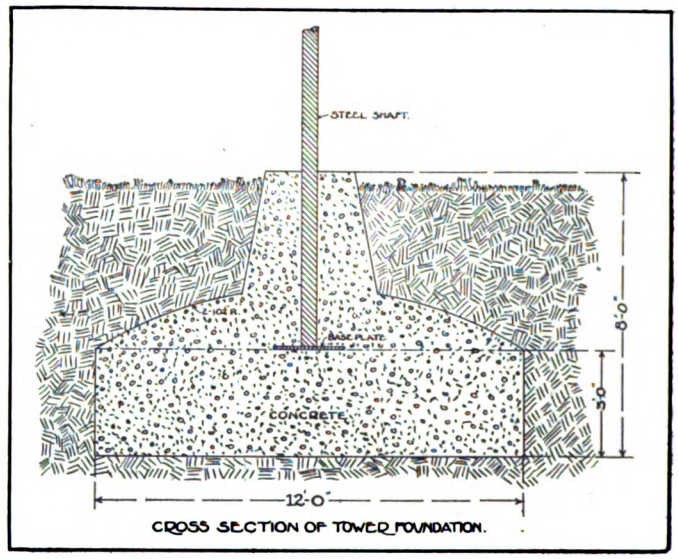


General View of Crossing.

Each stub is equipped at present with a double arm of three inch angle iron six feet long, on each arm of which are bolted six heavy porcelain insulators. The ends of the arms are guyed back with three-eighths inch messenger to the same slug that the stub is anchored to. By equipping each stub with another double arm six circuits can be carried across the river, three on each set of arms.

Owing to the flooding of the ground where the towers are located, and also on account of the nature of the soil, it was necessary to support the bases as follows: A hole twelve feet by twelve feet and five feet deep was excavated at each corner of the tower, or twenty-four feet from center to center. In the bottom of these were placed foundations of concrete two and a half feet thick, composed of one part Portland cement, three parts sand, and six parts crushed stone. On these foundations the base plates were placed, and the first section of the tower erected. Around the first section of each length a form was placed four and a half feet square at the bottom, three and a half feet square at the top, and extending upward from the foundation to about a foot above the surface of the ground. These forms were then tamped full of concrete made in the same proportions as that of the foundation. When this concrete had set the forms were removed, and earth was tamped in around the concrete bases. These helped to anchor the tower and also served as a protection to that part of the iron work below the surface of the ground. The towers were further held by spider guys of three-eighths inch messenger attached to slugs set in concrete about one hundred and twenty-five feet from the tower.

The wire used for the river span is of No. 12 plow steel. The wire was strung very successfully by taking one end of the coil up over one of the towers and back to the stub, where it was then fastened permanently with a double figure eight tie to the porcelain insulators on the angle iron double arm. The coil, which was of course on a reel, was placed on the stern seat of a row boat and allowed to pay out as the boat crossed the stream. When the opposite bank was reached the reel was carried back to the stub and the wire was then pulled up over the tower with a rope. Two pair of blocks with eccentrics were used to pull up the slack the same as in any other line work. The pulling was all done back of the stub, so that if the wire was nicked or kinked in any way by the eccentrics it would not come in the part used and thus endanger the giving way of the wire in times of wind or sleet storms. It was found that the best success was obtained by leaving a dip of forty feet, or a little more, in the span between the towers.

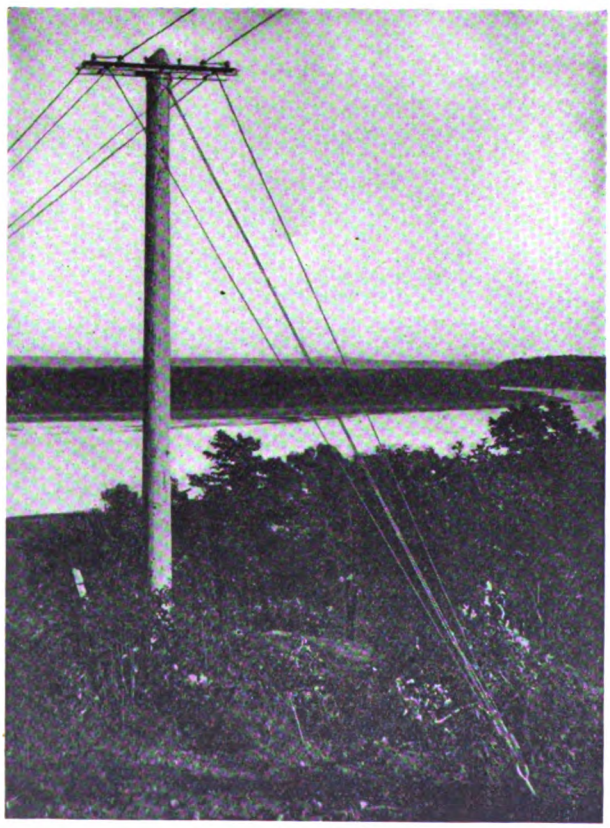


Sectional Drawing of Concrete Foundation.

These towers come in such sections that they can easily be erected by two good line men with the help of a small gin pole and a couple of ground men to help raise the upper sections.

Too much stress cannot be laid upon the fact that the anchors and stubs must be put in as carefully as the tower foundation, as the life of the span depends as much, or even more, upon the stubs than upon the towers themselves, as the wires are not fastened to the towers in any manner whatsoever, but simply run over the tops in the porcelain sheaves. This causes practically the entire horizontal pull exerted by the wires to be supported by the stub. Nothing less than the strongest and most reliable system of guying would hold.

It will be seen from the description and from the accompanying illustrations showing the line and its surroundings on both sides of the river that everything that could help to make all construction strong and permanent was planned and carried out with the greatest care. The periodical overflowing of the river banks led to difficulties that would not otherwise have been met with, but by the use of concrete and the very thorough system of guying these difficulties were successfully met. So careful and thorough has been the construction that the completed crossing should require very little attention.



View Showing Detail of Guying at Anchor Pole Back of Tower.

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Aspects of Technical Journalism*

By T. Commerford Martin.

THE growth of which Schenectady is in one great industry the distinguishing expression, carries with it the reason why the technical press has sprung into existence and has become a vital force. There was a time in the early days of the Institute when on looking over a list of its members I could claim to know every one of them—perhaps four or five hundred. To-day as I look over the list of 4,000 members—as I scan the Schenectady roster—there are scores and scores of names of men I never yet met. This is inevitable, perhaps it is best for them and for me. But given a growing art, an activity of creation in it, and an increasing number of men devoted to its prosecution, there seems absolutely no other satisfactory medium of intercourse for it except such a body as the Institute, or its technical and trade press. It is hard to conceive how a man desirous of keeping abreast of invention, improvement, experience and discussion in his profession or industry can possibly do so if he does not read with at least moderate diligence his technical paper. Even the worst trade journal is better than none; and the best will leave a true hunger for knowledge sorely unsatisfied. The technical journalist is a specialist, he is cultivating a restricted territory, he is working with a microscope, all of which tells against largeness, broadness, liberality. Yet intensified cultivation has its merits, and many a patch of lilies in Bermuda, or vines in France, yields a far more valuable product than a sprawling wheat farm in Minnesota with its thin fifteen bushels to the acre.

No technical man can find outside his special class journal the right intellectual food—tough, indigestible and badly cooked as most of it may be. The efforts of the daily press to be technical and supply valuable data, are laudable; the engineering supplement to the London *Times* is the best example of how far such a tendency can go; and the synopses given in many American journals of scientific and industrial news are praiseworthy from the standpoint of the average reader. But much of what gets into print thus is to be regarded with suspicion, though reflecting no discredit on the daily whose pages it brightens. Now and again there is a book in the nature of a revelation, but the majority of the text-books in our schools and on our shelves are years behind the latest things going. These facts the student, in college or out, must get from the technical press. Being often asked for the latest book on a subject I have been struck with the frequency, the invariability with which one's recommendation unavoidably carries with it a number of articles recently printed in the technical press.

When Mr. Carnegie a few years ago opened the library at Braddock, Pa., he warmly advised the careful reading of the trade press; and in his suggestive lecture on business at Cornell University in 1896, he remarked: "You see, gentlemen, the business man of this day has to read, yes, and study, and go to the root of many things, that he may avoid the pitfalls that surround business on every side." In other words, the technical journal is an essential tool of professional, industrial and commercial life.

When I meet a young engineer and discover that he has, unless for some valid reason, failed to join the national or local society of his branch of engineering, I find myself involuntarily putting a black mark against his name. When I discover also that he does not read regularly the journals of the art, he becomes more hopelessly "conditioned" in my mind, as one without professional pride and dignity, and as one who on his own confession does not keep himself so informed about progress that he can be properly useful in the world.

I have been formulating a plea or reason for the existence of technical journals as the clearing houses of current knowledge, as a necessary tool, as a means of intercourse, without any implication that any one of them is all that might be expected of it. Every human institution is branded with imperfection, and it is only of late years that most technical journals have even begun to attack the tasks before them or discharge the responsibilities resting upon them. Aside from the conceded inadequacy of the editors and managers—nowhere more painfully realized than among themselves—two very great difficulties steadily prevent these luminaries from being in full candle-power. One of these is the inability to find men who have a story to tell and who can tell it well. The other is the reluctance of corporations and individuals to make public for common benefit the information acquired primarily for themselves in dealing with a subject, and often at enormous expense. Both of these are evils and may be glanced at separately.

It may appear curious in these days when it is supposed that everybody writes to complain that there is not writing enough. Lady Holland once said to Lord Porchester: "I am sorry to hear you are going to publish a poem. Can't you suppress it?" And when one wades through the countless popular magazines, and the endless Sunday newspapers, and realizes how many beautiful miles of the forest fall daily under the axe to supply food for the ravenous presses of the age, it does seem as though the whispering trees would be better than so much loud talk. But as sinners against the Adirondacks, the technical papers are venial offenders with their little editions, when compared with "yellows" boasting half a million copies daily, or "muckrakers" running a million a month. Those outlets for the production of the intellect are always clogged with copy, but the technical journals in reality have little offered them voluntarily, and are frequently at a loss to get the right man to deal with a topic. For some inexplicable reason, the phrase "an officer and a gentleman" does not find its equivalent in "an engineer and an author," although the engineer almost daily has an experience or an observation which if duly recorded would be of value and economy to every one else in the same field of work; and even if the single fact is of little utility, a number of them might permit the generalization out of which great truths and great inventions would presently emerge.

If the technical journals could get more of these articles, they would pass in glad silence over the fact that the authors knew little of prosody or syntax, and have never used any but "simplified spelling." The great want of the time is, indeed, the ability to observe and then tell clearly and directly what is seen. This whole great electrical field of ours teems with obscure phenomena, with hints, suggestions, ideas, so that if a man notes something and does not know himself how to make use of it he can at least be useful by passing it on. There may be an improvement or a refinement in the art involved in the merest trifle; there may be the germ of a great invention. Such data are the very pith and marrow of the technical journal, and while I yield to none in profound admiration of the creative inventor—Edison, Thomson, Rice or Steinmetz—I become more and more convinced that in large measure the magnificent growth during the past century in the arts and sciences is due to the swift printing and circulating of new knowledge, which even to the genius is stimulating food for thought.

Perhaps there might be more encouragement for such writing if it paid better. True. In this respect the technical field, with its small editions, cannot compete with the daily paper or the popular magazine. I know something of the affairs of four technical journals, and in not one of them does the subscription price begin to pay for the mechanical cost of production—the paper, press-work, ink and binding. Obviously the margin for the intellectual cost cannot be very great; and it is not. I have never known a millionaire among trade press publishers; I have never known one who did not stick close to his job, working strenuously day in and day out to build up and conserve the business and the paper. The fact is, the contributor to a technical journal, like the author of a paper before the Institute, must not overlook what we may call the "earned increment" that

(*Continued on page* 304.)

*Abstract from an address before the Schenectady Branch of the American Institute of Electrical Engineers, October 5, 1906, by T. Commerford Martin, Past President and Editor of the *Electrical World*.

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IN THE OPERATING FIELD

PROGRESS OF RURAL LINES DISCUSSED AT NINTH DISTRICT CONVENTION IN INDIANA.

THE third quarterly meeting of the Ninth District of the Indiana Telephone Association was held at Vincennes, November 1. The meeting was by far the most interesting and profitable yet held in the district. Practically every Independent telephone company in the district was represented. The value of the meeting was also enhanced by the presence of A. C. Lindemuth and C. S. Norton, president and secretary, respectively, of the State Association. The regular program began with a paper read by Mr. Philip Dilly, of Huntingburg, on "The Value of Rural Telephones." Mr. Dilly's paper was made very interesting by the citation of a large number of occasions in which the telephone has played an important part in rural life. Mr. Dilly said that still greater service would be had from the telephone, but in order for the rural communities to come into their own and be ready for future enlargement and ultimate connection with the outside world preparation must be made. He insisted that the time would soon be here when standardization would be imperatively necessary and he urged the managers of the rural lines to begin at once to prepare for the greater things that would be theirs in the near future.

A lengthy review of the progress in the district was made by Mr. Charles McGregor, of Mt. Vernon. Mr. McGregor said the number of telephone companies had increased 15 per cent. and amount of business from new patrons had increased more rapidly than the companies could take care of it. Many miles of extensions have been made and numerous new territories have been developed. The Dubois County Telephone Company has just completed a No. 10 standard copper line from Huntingburg to Princeton, a distance of nearly fifty miles. "This line," said he, "cuts the Cumberland monopoly squarely in two and affords all the Independent companies of the district except at Mt. Vernon, an outlet to Louisville and the Southwest. Another toll line is building between Henderson, Ky., and Mt. Vernon, and this, too, will give the Independents the much desired outlet for long distance service." Mr. McGregor thought it only a matter of short time until the Independents would enter Evansville and this will be the last and only needed victory over the opposition.

Following Mr. McGregor's review, five-minute talks were made by nearly every delegate present. The reports made by these delegates indicated a very healthy condition of the companies of this district. The delegates showed a determined disposition to refrain from forming any alliance with the Bell company.

President Lindemuth and Secretary Norton of the State Association each gave encouraging and instructive addresses, and assured the members that the great progress made in the Ninth District reflected the condition all over the State. A pleasant and enjoyable feature of the convention was a luncheon at the Grand Hotel, as the guests of W. H. Volmer and W. H. More, of the Vincennes Telephone Company.

HATTIESBURG, MISS., TO BE PROVIDED WITH FIRST-CLASS SERVICE FROM A HIGH GRADE INDEPENDENT TELEPHONE PLANT.

THE new exchange of the Home Telephone Company at Hattiesburg, Miss., has recently been put in operation. The company has a thoroughly modern plant, with a central energy switchboard of first-class manufacture. Every arrangement of which the company could learn for giving the highest class of service has been installed, and it is expected that it will be able to fully satisfy the most exacting requirements of its subscribers. The list of these is rapidly increasing, in fact, new connections are being made so rapidly that the company has found it impracticable to issue a directory at this time. The new system is especially pleasing to the citizens of the town in general, as well as to those depending upon it for service, owing to the fact that through the business streets all main cables are underground. At the present time a great many of the citizens in Southern Mississippi are experiencing serious difficulties with telephone service from the Bell company which operates there, and Hattiesburg is to be congratulated upon the building of this new exchange by an Independent company.

ASPECTS OF TECHNICAL JOURNALISM.

(*Continued from page 303.*)

comes from publicity, enhanced reputation and the wonderful usufruct that flows in upon us every time we do a public service or a disinterested act.

This brings me to the other consideration I referred to in the matter of publicity. Roughly, possible writers for the technical press are grouped into men who couldn't and men who mustn't, leaving editors a very narrow range of collaboration. In other words, it is often to the interest of a great corporation to keep its mouth shut, and the casuistry of that situation has frequenly caused me hours of perplexity. It all gets back to the old question of morals and sociology, how far a man has a right to that which is his own.

The fact that an important matter is not mentioned by the technical press does not imply ignorance of it. This year I published an article in regard to an important invention of which I had had knowledge for the last four years. During that time not one word had been printed about it. The list of the recipients for the Carnegie medal for heroism ought really to include people who, under temptation, hold their tongues. Sometimes things leak in a mysterious way, sometimes in a nefarious way, but it may be questioned whether the case is on record of a technical editor who took, or paid for knowingly, the story of an employee giving away the confidential secrets of the company he had been serving. It could not well be otherwise. It is not a question of fear of losing advertising patronage. That is curiously exaggerated in the public mind. I do not know a technical journal that could not lose the advertising patronage of half a dozen of its largest patrons without the slightest financial injury in the long run.

As noted already, each corporation has its publicity or literary bureau, which does deft, clever work of a high informational value. In the technical field, this tendency results in the diffusion of a great deal of useful data of benefit to everybody in the art, whether going directly at first hand into the columns of the press, or given to that more select and critical audience constituted by such a body as the membership of the Institute. The only objection to the present prevalent plan of spreading the same article profusely broadcast is that it becomes mutilated or emasculated because self-respecting papers object to print the same "story" *verb et lit*, just as though it were a mere electrotype. The other plan of inviting the editors to inspect a new appliance, and then give their own version, is better, even if they get it a bit wrong. One popular plan which has many obvious demerits is the modern house organ, where a corporation can say what it wants as it likes, and vaunt itself to the skies as to any new plant or product. Everybody discounts that kind of publicity immediately, and it carries no weight, even as compared with the issuance of exactly the same matter in a venal journal that makes a living by printing "write-ups." It is exactly the same kind of discount that an electrical journal is involuntarily subjected to by a general reader who peruses its advocacy of something electrical as preferable to something that is not. In the final analysis what we are all seeking is the truth published without bent or bias, without fear or favor.

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DIRECTORY ADVERTISING IN BALTIMORE.

THE statement "Advertising Gets More Business" appears in a line of large type at the top of a neatly printed slip of paper pasted to the front cover of the latest issue of the Maryland Telephone & Telegraph Company's directory. It is followed by the statement, "An advertisement in this directory is of the most conspicuous and persistent kind. It reaches the people many times a day at a moderate cost."

That advertising does get more business for the Maryland company, and that its book is a first class medium, is shown by a comparison of its size with previous issues. At the top and bottom of every page is carried the advertisement of some well-known local concern, while the margins are utilized to set forth some point in connection with the company's own business, in some such manner as the following significant query: "Is the telephone and electric service better and cheaper than before we came?"

TELEPHONE TO BE USED FOR TRAIN DISPATCHING ON MEXICAN RAILWAY.

WITHIN a month it is expected that the Chihuahua division of the Mexican Central Railway will be equipped with apparatus for giving simultaneous telephone and telegraph service. For about a year G. W. Perkins, superintendent of telegraphs of this railway, has been experimenting with the telephone, on his telegraph lines, and the results have been very satisfactory to him. Telephones are to be installed at designated stations along the line, and trains provided with an instrument.

TWO HUNDRED SUBSCRIBERS GAINED IN SIX WEEKS BY INDEPENDENT TELEPHONE COMPANY OF NEWARK, OHIO.

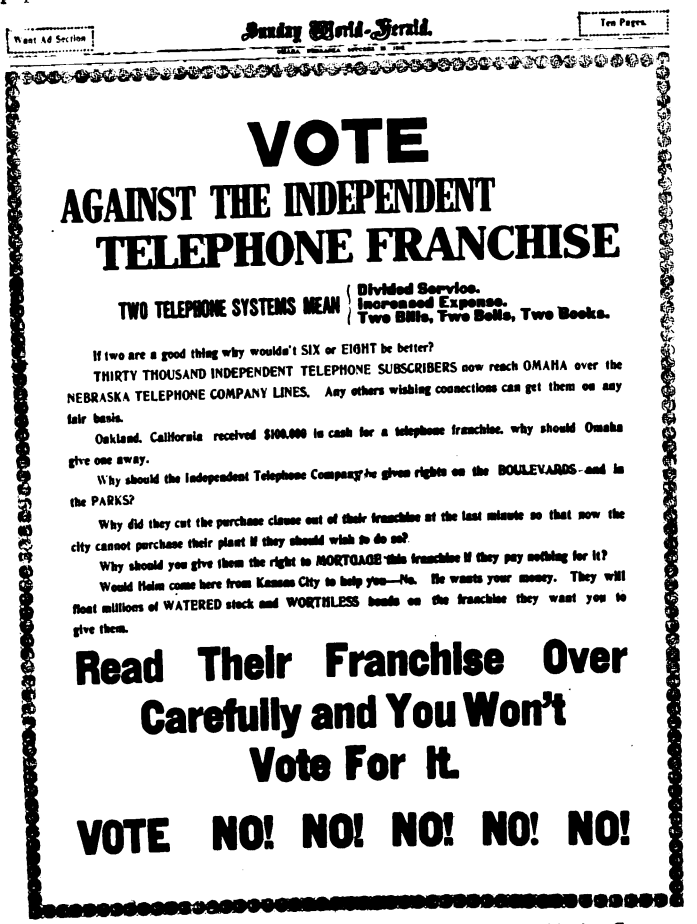
ALTHOUGH busy in the work of construction and extending cables to various parts of the city, the Newark Telephone Company, of Newark, O., has suffered no diminution in the rate of increase of its subscribers. In a recent issue of a local paper it has been obliged to publish the names of 200 subscribers who have been added to its system in about six weeks, since the issue of its last directory.

The company is making this extremely satisfactory growth in the face of most vigorous opposition. The completion of the work of reconstruction will give it a means of readily handling the expected increase in all parts of the city, and the value of its service, after the improvements have been made, will be so much enhanced that continued expansion at the present rapid rate may undoubtedly be expected.

OMAHA FAVORS FRANCHISE FOR INDEPENDENT COMPANY BY VOTE OF FOUR TO ONE.

AN Independent franchise, the granting of which was left to the people of Omaha for decision at the regular election, was favored by practically all voters. This, in view of the vigor of the campaign carried on by the Bell company, is nothing less than extraordinary. The figures show that the measure was carried by a vote of about four to one. For a long time the Bell company had been opposing the educational efforts of the Independent promoters by an almost reckless use of every advertising device which would suit its purpose, and is said to have exerted every form of influence available to bring the governing powers of the city and the people to its own way of thinking.

The utter worthlessness of this form of opposition to the granting of a franchise, under the conditions prevailing in Omaha, where thousands of patrons of the Independent lines within a few miles of the city are eager for connection with its merchants, is shown by the result of the election. The Independent telephone men in Nebraska and Iowa say that this action of the people of Omaha has opened up the last stronghold of the Bell company in the large territory which they cover to competing telephone systems. It will give a completeness to the service offered by these systems which will be very useful to their subscribers. It is said that the construction of an Independent plant in the city of Omaha will begin within a short time; the company has promised to install an Independent toll station in the city within thirty days.



Want Ad Section — Sunday World-Herald — Ten Pages.

VOTE
AGAINST THE INDEPENDENT TELEPHONE FRANCHISE

TWO TELEPHONE SYSTEMS MEAN { Divided Service. Increased Expense. Two Bills, Two Bells, Two Books.

If two are a good thing why wouldn't SIX or EIGHT be better?

THIRTY THOUSAND INDEPENDENT TELEPHONE SUBSCRIBERS now reach OMAHA over the NEBRASKA TELEPHONE COMPANY LINES. Any others wishing connections can get them on any fair basis.

Oakland, California received $100,000 in cash for a telephone franchise, why should Omaha give one away.

Why should the Independent Telephone Company've given rights on the BOULEVARDS and in the PARKS?

Why did they cut the purchase clause out of their franchise at the last minute so that now the city cannot purchase their plant if they should wish to do so?

Why should you give them the right to MORTGAGE this franchise if they pay nothing for it?

Would Heim come here from Kansas City to help you—No. He wants your money. They will float millions of WATERED stock and WORTHLESS bonds on the franchise they want you to give them.

Read Their Franchise Over Carefully and You Won't Vote For It.

VOTE NO! NO! NO! NO! NO!

Does This Ad. from the Omaha World-Herald Look As If the Company Has Been a Bit Frantic in its Franchise Campaign? No! No! No! Yes?

"The (Bell) company is buying advertising space in the newspapers and filling it with the most flagrant misrepresentations in a desperate effort to avert the inevitable.

A sample brick of the structure of imposture that the Bell company is trying to build in the public mind was the statement that was made Sunday morning in the Bell company's printed plea to be let alone. It was printed in big letters that the pending Independent franchise had been changed "at the last minute," and an optional purchasing clause stricken out of the ordinance.

The shameless mendacity of the allegation is made apparent when it is understood that not only was there no such change in the ordinance, but no change of any kind whatever was made. Not a T was crossed nor an I dotted after the ordinance was first introduced. The ordinance was advertised at length in the newspapers for two weeks after its introduction, and in the third week following it was placed on third reading and passed. The ordinance as introduced, and as advertised, and as passed, was identically what it is to-day."

Abstract from Article Which Occupied the Top of the First Page, Omaha (Neb.) World-Herald, Monday, October 29th.

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Automatic Telegraph Repeater Connections

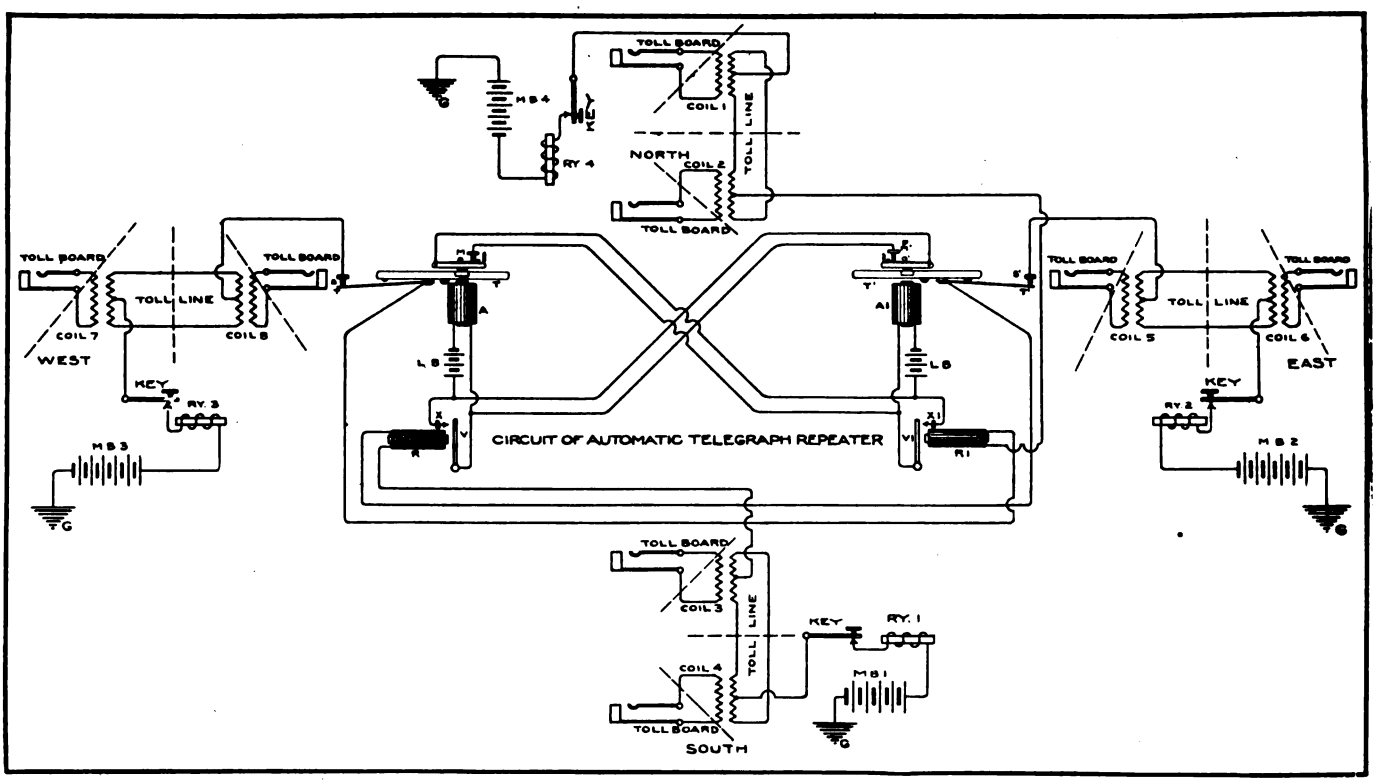
By Louis Mühlheizler.

With the development of "leased wire" telegraph service over simplexed circuits the various features of telegraph work have become most interesting to telephone men. When lines used for this class of service radiate in more than one direction from a central point, and transmission of telegraphic signals from one line to the other is desired, it is necessary to use the device known as a "telegraph repeater." This instrument is necessary in this case to prevent the grounding of circuits, which would be produced by direct connection. The repeater is also used as a "booster" on lines so long that the telegraphic current would become so reduced, owing to the ohmic resistance and leakage of the line, as to produce poor signalling.

In the diagram appearing upon this page is shown the method of connecting a telegraph repeater, one of the best known commercial types of apparatus for this purpose, to the simplexed lines and toll board jacks of a telephone exchange. The operation of the repeater is as follows:

When a key on the "West" circuit is opened the instruments assume the positions shown in the diagram. The armature of relay R_1 first falls back and opens the local circuit of transmitter T_1, which in turn opens the "East" circuit, as well as circuits "North" and "South" at S_1 R_1, thus causing the armature of relay R to fall back. This falling back of the armature of relay R however does not affect the local circuit of transmitter T_1, because before the "East" circuit was broken at S_1 R_1 the shunt around the local contacts of relay R was closed at M_1 O_1. On closing the "West" key the armature of relay R_1 closes the local circuit of transmitter T_1, which in turn first closes the "East" circuit at S_1 R_1 and, as already explained, after sufficient time has elapsed to permit the armature of relay R to reach its front stop, the shunt circuit of transmitter T at M_1 O_1.

Should "East" break when "West" is sending the armature of relay R would remain on its back stop, thus breaking the local circuit of transmitter T on the first downward stroke of the superposed armature of transmitter T_1 and so break the "West" circuit at S_1 R_1. This also applies to both "North" and "South" circuits. Coils a and a_1 can be wound from 20 ohms to 150 ohms as desired. In doing this it would be a question of voltage to work the local relays. R and R_1 should be not less than 150 ohms to get good results. Letters MB_1, MB_2, MB_3, MB_4 designate the main line battery. Telegraph sets are designated as follows: Ry_4 North, Ry_1 South, Ry_2 East, Ry_3 West. Coils 1-2-3-4-5-6-7-8 are repeating coils on the toll lines North, South, East and West.



Connections for Telegraph Repeater Used on Simplexed Telephone Lines.

WHAT IS A "PAY STATION?"

Lyman J. Rogers, of Pokagon township, near Dowagiac, Mich., has filed a bill in chancery to compel the Michigan State Telephone Company to perform a contract which was entered into last March between Mr. Rogers and the telephone company, in relation to the establishing and maintaining of a telephone and public pay station at his farmhouse. The trouble all hinges upon the difference in the interpretation of the words "pay station" by the two parties. Mr. Rogers interpreted it to mean a telephone and station similar to long distance stations, where tolls are collected by the one in charge, and a set of books are kept. The telephone company interpreted it to mean an automatic pay station where one can do his talking after he drops in his money.

Mr. Rogers notified the telephone company that he would not have an automatic station, but some time in June two employes of the local exchange were sent out with orders to put up the automatic attachment or take out the telephone. The result was that Mr. Rogers refused to permit the putting up of the automatic attachment and the telephone was taken out.

GOOD PROGRESS REPORTED AT MEETING OF OHIO DISTRICT NO. 1.

The annual convention of District No. 1 of the Ohio Independent Telephone Association, representing Erie, Lorain, Cuyahoga, Huron, Medina, Lake, Geauga, Ashtabula and Trumbull counties, which was recently held at Cleveland, was characterized by the attendance and enthusiastic participation of

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many of the leading Independent telephone men of the country.

About fifty members were present of a total enrollment of 167 active operators and officials in the association. C. L. Norton was elected vice-president of the association and E. L. Coen secretary.

Frank L. Beam, of Columbus, president of the Ohio Association, and James S. Brailey, Jr., head of the Ohio telephone syndicate, addressed the convention. Mr. Brailey's talk was on the method of financing telephone companies. Other speakers were D. E. Sapp, of Columbus; E. B. Fisher, president of the Michigan Independent Telephone Association; C. E. Tarte, general manager of the Citizens' Telephone Co. of Grand Rapids; C. Y. McVey, operating head of the Cuyahoga and United States companies, and E. U. Hyde, of Warren.

Much of the practical work of the convention had to do with the progress made in standardizing equipment. The report of the committee on statistics shows that the Independent movement in the district has had a wonderful growth since the last meeting a year ago. The long distance service has been greatly improved and an increase of general efficiency of 50 per cent. has been reported. In addition there are expectations of an increase of 30 per cent. promised for this year.

Telephone Company's Exhibit at Street Railway Men's Convention

THE Columbus Citizens' Telephone Company had a splendid exhibit of the apparatus used in its exchanges and subscribers' stations, giving a complete demonstration of its service, in the monster convention and exposition of the American Street and Interurban Railway Association, held at Columbus, October 15 to 19.

The exposition itself was one of the most successful ever held by the association, the Ohio State fair ground being a most advantageous meeting place from all points of view.

A North Electric Company's magneto switchboard was installed and seventeen stations were connected up with it. These had been subscribed for by exhibitors at $5 each for the week, and there were also seven pay stations with coin collectors. Automatic telephones were used so connected that the moving of the dial or the pressing of the button threw the drop at the switchboard.

A small switchboard of an exhibition pattern was set up in the small space at first assigned, but as an accommodation to another exhibitor Manager G. R. Johnson gave up this space and was placed in a much larger space which he had to hustle to fill. It was accomplished by installing in addition to the magneto switchboard two Stromberg-Carlson private branch exchanges and some North Electric magnetos and small equipments from the stock room.

An upright pole containing a cable terminal was set in the middle of the space and the walls were decorated by photographs of a number of exchanges. For exhibition purposes six telephones duly numbered, one having its working parts exposed, were connected in, and the demonstrator was thus able to show the entire process of calling, transmitting, signalling and receiving. The spectators were permitted to ring up and call for themselves.

As a consequence of having in action mechanism and interesting machinery the operation of which was not commonly understood, great crowds were about the automatic telephone exhibit constantly. It was especially noticed that the crowds were not composed of simple-minded curiosity-seekers, but the workings were the subject of investigation and praise by some of the brightest minds on the continent, capable of fully appreciating the operation of the mechanism.

Between 3,000 and 4,000 distinguished visitors, many of them from Eastern cities, where the Independent service is not so well known as it is in the Middle States and the West, had a splendid opportunity to investigate the system.

The AUTOMATIC IS ALL THERE
NOON to MIDNIGHT-EVENING to SUNDAY
ALL THE TIME
NEW YEARS to THANKSGIVING DAY
OVER 9000 AUTOMATIC TELEPHONES
OPERATING IN COLUMBUS.

Group of Various Types of Telephone Switchboards and Instruments Exhibited by the Citizens' Telephone Company at the Street Railway Men's Convention.

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THE EDITOR'S PAGE

METHODS OF GETTING NEW BUSINESS.

ACTIVITY in extending their plants is one of the fundamental causes of the success of the Independent companies. They realize the possibilities of the telephone. The results obtained in so many of our cities where in a few months a very large percentage of the population have become subscribers to the service of the Independent exchange serve as a constant stimulus to those who wish to equal the remarkable records of their friends in other places. Those in charge of the general business policy of the companies, under present conditions, may almost invariably be assured of sufficient funds to carry out any needed preparations for growth, provided the operating policy is sound. So it is that, with funds available, the great desire of a telephone manager is to get them invested in a productive telephone plant. This means not only rapid work in building, but also rapid work in getting new subscribers to use the new equipment, on which the fixed charges must be not far from equal, whether it be idle or productive. Furthermore, it is fully understood that the value of the service increases with the addition of each new subscriber, and the power of numbers is a thing which cannot be overlooked as an argument for convincing prospective customers.

It is for these reasons that the telephone conventions are the scenes of so many discussions of this subject. Managers find, however, that such discussions are in a restricted field. The number of ideas developed in a county or a State is much smaller than the sum of thought along this line in the nation. A national medium of exchange is needed. This need is supplied by the pages of a paper devoted to the telephone industry. Telephone managers may obtain the ideas of others in exchange for their own if they will publish them. THE AMERICAN TELEPHONE JOURNAL will freely open its columns to descriptions of successful methods of getting new business, and invites the co-operation of all operating men.

TELEPHONE COMPANIES AND LIABILITY INSURANCE.

EMPLOYERS' liability insurance is a new form of an old business and has attained large proportions in recent years because it supplies the long felt want of enabling employers to shift to some third person the risk of liability for personal injuries to employees and others. When a man in business makes a contract that he feels will relieve him from the worrisome necessity of defending law suits, he finds therein a great deal of satisfaction. But when it becomes necessary to himself to bring a law suit to compel the liability insurance company to protect him from law suits and claims for damages, liability insurance seems to have lost its usefulness. The attitude that some liability insurance companies take in demanding a strict, literal and narrow construction of their contracts of insurance, is discouraging to prospective insurers and accordingly harmful to their business.

The Camden & Atlantic Telephone Company, which maintains a telephone line from Camden to Atlantic City in the State of New Jersey, is having an experience which makes it doubt the value of liability insurance. About December 16, 1903, the company made with the United States Casualty Company a contract for $5,000 insurance, against loss from common law or statutory liability for damages on account of bodily injuries, fatal or non-fatal, accidentally suffered within the period of the policy by any person not employed by the assured, at or about any of the work of the assured, excepting, among other things, any loss suffered by the assured by reason of its liability for damages on account of injuries suffered otherwise than during the immediate doing of the work of construction. The work of the assured which was covered by the contract was described as "operation of plant, including construction, maintenance and extension of lines and making of service connections." The Casualty Company, upon being notified, was to defend or settle any suit brought against the assured to enforce a claim for damages on account of the accident covered by the contract, or pay the assured the indemnity for which the contract provided.

In March, 1904, during the continuance of the insurance, the company in constructing a telephone line, found it necessary to trim certain trees on land abutting on the public road in which it was erecting poles and stringing wires. All but one or two of the limbs had been removed from one of the trees. In order to get the consent of the land owner to the necessary trimming of other trees on his land, the telephone company's employees agreed to remove the remaining limbs from this particular tree. In doing so, a heavy limb fell upon a man not in the employ of the company, and injured him so that he subsequently died. The administratrix of the estate of the deceased brought suit and collected thereby from the telephone company $4,405.35, besides which the company was obliged to spend over $800 in making its defense. The Casualty Company was duly notified in accordance with the terms of the contract, but refused to defend or protect the telephone company in any way, and the telephone company has now been compelled to sue the Casualty Company to enforce its contract of insurance. The defense of the Casualty Company is that the trimming of the tree was in the nature of a payment to the land owner for the privilege of trimming his other trees, and that the employees of the telephone company were not engaged upon the kind of work mentioned in the policy and therefore the accident was not covered by the terms of the policy.

Considering the merits of the case, it seems that even though the work was done to get the consent of the land owner to the trimming of his other trees, it should be considered as justly covered by the phrase, "operation of plant, including construction and maintenance and extension of lines." The trimming of the other trees was necessary to the construction of the line, the cutting of the limb that fell was necessary to get the consent of the land owner to the trimming of the other trees. Both operations were linked together as part of the necessary construction. If the Casualty Company succeeds in making the technicality stick in spite of the reasonableness of the telephone company's contention, telephone companies will find the usefulness of liability insurance very much impaired and insurance companies will have to devise a more liberal contract and adopt a broader construction to retain the business of telephone companies. This particular case, and others of a similar nature, have produced among the telephone companies which have become familiar with the facts a strong disposition to abstain from making contracts with a concern having an unsafe reputation. Mr. C. E. Wilson, general manager of the Keystone Telephone Company of Philadelphia and president of the Camden & Atlantic Telephone Company above referred to, has announced his intention of bringing this subject before the Executive Committee of the International Independent Telephone Association for such action as may be generally beneficial to telephone companies. This is a matter of substantial importance to all operating companies, and managers having anything to contribute to a discussion of the subject should take advantage of the present opening.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

INCORPORATION OF TELEPHONE COMPANIES IN SOUTH DAKOTA.

What are the facts to be stated in the articles of incorporation of a telephone company in South Dakota? Is it necessary to describe the line and where it runs, or can we incorporate by giving just the same information that an ordinary business corporation has to give? D. C. L.

THE items to be given in articles of incorporation in South Dakota are the following: First, the name of the company; second, the places to which and from which the proposed line is to run; third, the estimated length and the names of the counties through which the line is to be built; fourth, the amount of capital stock with the number of shares into which it is divided, and a statement of the kinds of stock, showing how much common stock, and how much preferred stock is to be issued; fifth, the names of the directors and their residence; sixth, the term of existence of the corporation, which must not be over thirty years; seventh, the place where the principal office will be located. The second and third items are not required in the formation of an ordinary corporation, and are necessary in the organization of a telephone company. You therefore could not organize under the law for general business corporations, but should follow the particular law as above stated. This will be found in Section 554 of the Revised Code of South Dakota for 1903.

LICENSE TAXES IN VIRGINIA.

Whereabouts in the laws of Virginia is there any provision for a license tax upon telephone companies? Kindly explain what the system is there. Do corporations and private persons pay the same taxes? C. L.

SECTION 36 on page 2213 of the Virginia Code imposes a license tax of $2 per mile on a line of poles and conduits, and an additional charge of two per cent. of the gross receipts. This is for the privilege of operating. The companies have to report to the state corporation commissioner, who assesses upon their property the taxes imposed by law. The company furnishes a statement to the county commissioner and board of supervisors who spread the taxes upon the property in their district. Persons and firms not incorporated must pay at a rate of not less than $125 for one mile of wire and $25 for each additional mile. Acts of Assembly 1906, Chap. 295.

DAMAGES FOR FIRE CAUSED BY LIGHTNING.

IN Franklin County, Me., Edith E. Wells brought suit against the Northeastern Telephone Company to recover damages for the destruction of her barn and its contents by fire alleged to have been caused by the negligence of the defendant in the construction and maintenance of its telephone line past the plaintiff's premises upon the west side of the highway in the town of Avon, and recovered a verdict of $804. One of the company's poles on which its line wires were suspended was erected within about five feet of the corner of the barn and a guy wire was stretched from the pole to the corner of the building. There was no lightning arrester or other appliance connected with this guy wire or with the telephone wires in that vicinity to divert powerful currents to the earth at the time of thunder storms. Just before the fire a thunder shower came up and there was a discharge of lightning of extraordinary violence. A board on the corner post of the barn was newly split from a point a little above where the guy wire was attached downward nearly to the sill. When first seen, the fire was directly beneath the point where the guy wire was connected, and there was no indication that the barn had been struck by lightning at any other point. The plaintiff's theory in substance was that a flash of lightning struck the telephone wires nearby, and that an electric current was eventually conducted by means of the guy wire to the corner of the barn which was thus ignited. The company's theory was that the barn was destroyed by lightning, which descended directly from the clouds and communicated the fire without intervention of any of its telephone wires.

The court held that the evidence warranted the jury in believing that the destructive spark was conveyed to the corner of the barn by the telephone wires, and that the telephone company did not exercise reasonable care in establishing its line at that point. The court also decided that, assuming the correctness of the company's theory, that it is utterly impracticable to divert lightning currents from such a wire to the earth by means of any insulators or circuit breakers hitherto devised, the jury was not wrong in finding that the wire should not have been attached to the barn at all. Concerning the duty of the telephone company, the court expressed the opinion that the company was not obliged by law to guarantee the safety of its system under all possible conditions and circumstances, but was required to exercise that due and ordinary care which the present state of scientific knowledge, as well as common observation of the nature of electricity, and the enormous power of lightning, would suggest as reasonably necessary for the protection of life and property along its line. Wells v. Northeastern Telep. Co. (Me.), 64 A. 648.

FRANCHISE COVERS EXTENSIONS IN OHIO.

SOME months ago the city of Niles, O., brought an injunction suit against the Bell Telephone Company to prevent it from extending its lines and setting poles on streets other than those mentioned in the franchise. The case has resulted in a decision for the defendant company, holding that the ordinance under which the company holds its franchise still is valid, and that the company can go upon streets not specified for the necessary extension of its business. It was also held that the company had fulfilled all the requirements in that it applied to and was given permission to occupy the streets in question. The city will appeal.

SUBSCRIBER TO PAY TELEPHONE LIABLE FOR ONLY EIGHTY PER CENT. OF EARNINGS.

THE Supreme Court, Brooklyn, has enjoined the New York and New Jersey Telephone Company from discontinuing the pay telephone service in the stationery store of Israel Ratner. Ratner had guaranteed that the telephone should earn a minimum of $3.50 a month. Ratner's attorney argued that, since the contract gave his client 20 per cent. of the proceeds, the company could not hold him responsible for more than $2.80 a month. It is understood that the decision applies in many cases throughout the city.

COMPANY FINED $18,000.

IN the matter of the Cumberland Telephone Company vs. the Mayor and Aldermen of Yazoo City, Miss., the Federal Court has granted an order restraining action of that body in the troubles that now exist at the Yazoo capital. The restraining order is temporary and will hold the citizens of Yazoo City in check until the matter can be heard in full by the court. This is the outcome of the action of Mayor Holmes in inflicting a fine of $18,000 against the company for alleged willful disregard of the city ordinance enacted to compel this company, as well as other telephone corporations, to string their wires on opposite sides of the street from electric light wires, which order the Cumberland people resisted, though the Mutual company complied with the mandate.

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TELEPHONE PATENTS

VISUAL SIGNAL RECEIVING SYSTEM.

Ernest A. Faller, New York, N. Y., patents (No. 822,888; dated June 5, 1906; filed July 28, 1903; serial No. 167,311) a visual signal receiving system.

In this patent the inventor describes apparatus and circuits by means of which a subscriber can cause to be automatically illuminated a lamp associated with a trunk line leading to a desired section in the switchboard, and subsequently an additional lamp associated with the line of the called subscriber, thus serving as a guide to the operator at the central office, with the object of reducing the mental effort on her part to a minimum.

RELEASE FOR PARTY LINE EXCHANGES.

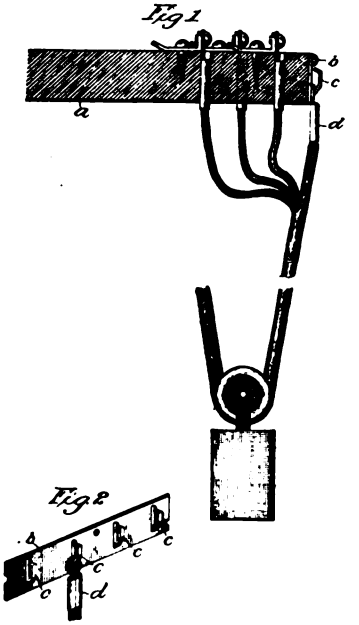
Clarence A. Anderson, Salina, and William Hagstrom, Lindsborg, Kansas, patents (No. 832,946; dated Oct. 9, 1906; filed Feb. 8, 1905; serial No. 244,754) assignors of one-third to John Anderson, Salina, Kansas, an automatic release for party line exchanges.

This invention relates to step by step party line systems of the type where the release of mechanism at the subscriber's station is accomplished by sending from the exchange an impulse of opposite polarity. The inventor provides a step by step mechanism at the exchange whose function is to send a prolonged impulse over the party line as soon as the plug is withdrawn and thus makes it impossible for the forgetfulness of the operator to tie up the line.

CONNECTING CORD SUPPORT.

Edward R. Graft, Chicago, Ill., patents (No. 833,778; dated Oct. 23, 1906; filed Dec. 7, 1904; serial No. 235,852) and assigns to Western Electric Co., Chicago, Ill., a fastening for switchboard connecting cords.

Fig. 2 shows the complete device which consists of a metallic



strip *b*, from which are stamped metallic tongs which are formed into hooks *c*, which engage with the eyes on the ends of the connecting cords. Fig. 1 shows the strip *b* fastened to the rear of the cord shelf *a*. The length of the inwardly turned upper extremity of *c* is greater than the diameter of the eye on *d*, so that in order to remove the eye from the hook it is necessary to completely reverse the position of the eye. It is therefore impossible for the cord to become accidentally detached from the hook.

POLE BASE.

Henry H. Clough, Elyria, Ohio, patents (No. 833,202; dated Oct. 16, 1906; filed June 5, 1905; serial No. 263,721) a pole base.

The pole base, which is of reinforced concrete, is shown in

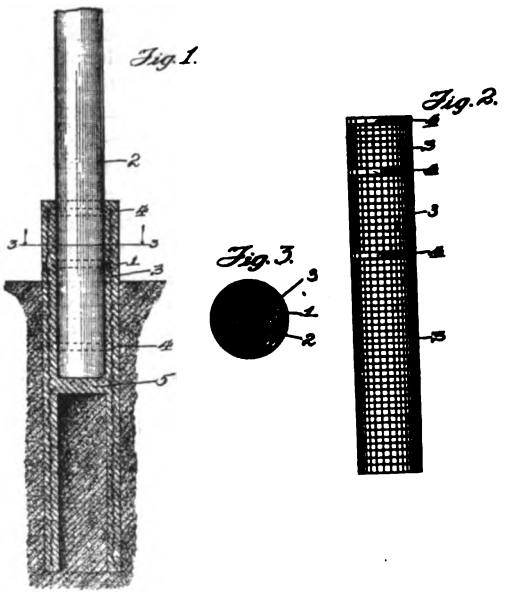


Fig. 1. Fig. 2 shows the metal strengthening cage, which is provided with reinforcing bands at 4, 4, 4. Fig. 3 is a horizontal section of the base. The inventor intends that the base shall be constructed in the field within cylindrical forms of building paper or other convenient material inserted in a hole for this purpose. The reinforcing cage is inserted between the two concentric forms before the concrete is poured in. The space beneath the concrete web 5 may be filled with earth and the inventor recommends that the concrete for the web be then placed on this earth and tamped. By the use of this base it is claimed that shorter poles may be employed and that the lower portion of the pole is protected from dampness and decay.

COMMON BATTERY TRUNKING SYSTEM.

J. W. Lattig, Wyncote, and Charles L. Goodrun, Philadelphia, Pa., patent (No. 829,164; dated August 21st, 1906; filed October 22nd, 1903; serial No. 178,110) and assign to the Eastern Telephone Manufacturing Company, West Chester, Pa., a common battery trunking system.

The inventors have provided a trunk to be used in connection with a subscriber's cord circuit, to permit the proper actuation of supervisory signals in an A operator's cord circuit, so that she may have entire control of a connection, a disconnect signal being given the B operator on the withdrawal of the A operator's plug from the trunk jack.

To accomplish the desired results the inventors connect in the tip wire of the trunk circuit a relay, the armature of which, when closed, completes a circuit through a trunk signal lamp. To permit passage of talking and signalling current, this relay is shunted by a condenser. As the trunk line is to all intents and purposes a continuation of the cord at the A position, the only new element introduced is the resistance of the line, and, subject to the

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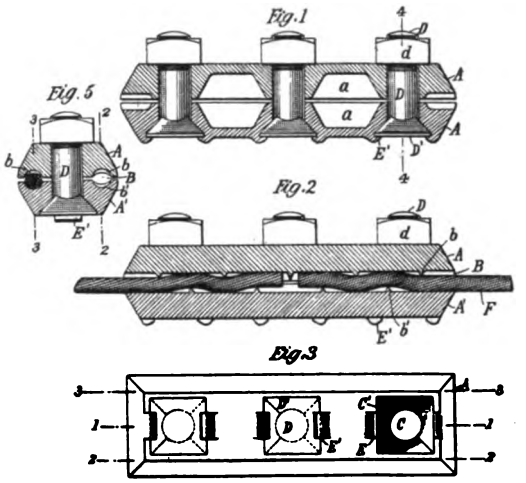
limitations thus imposed, direct supervision may be had at the A position from its own battery in the same way as if the connection were completed directly in the subscriber's multiple. The disconnect signal is given to the B operator as follows: Current from a common battery is supplied to the subscriber's station over the line circuit, through impedance coils permanently connected therein, as described in patent No. 722,367, dated March 10, 1903, and reissued September 8, 1903, as No. 12,156, to the same inventor. The supervisory circuit from the A position is completed over the opposite side of the trunk line from the one in which the relay is inserted, so that during the continuance of a connection this relay remains inactive. On withdrawal of the A operator's plug, while the B operator's plug is connected to a line, current from one side of the line battery flows through the relay in the trunk circuit, a contact in the specially designed spring jack at the A position adapted to short circuit the line when no plug is in this jack, and back to the other side of the line, thus actuating the relay in the trunk circuit, and causing the disconnect signal to be illuminated.

CABLE CLAMP.

John H. Cook, New York, N. Y., patents (No. 832,595; dated Oct. 9, 1906; filed Nov. 30, 1903; serial No. 183,162) and assigns



to Henry B. Newhall, Plainfield, New Jersey, a clamp for holding the ends of wire cable.

The construction of this clamp is best understood by reference to the illustrations. Fig. 3 is a bottom view of the clamp, Fig. 1 a vertical section on the line 1 1, and Fig. 2 a similar section on the line 2 2 of Fig. 3. Two longitudinal channels *B*, for the cable, are provided on each side of the clamping bolts as shown in Fig. 5. The bolts are countersunk in the lower half of the clamp and the lugs *E E*, are bent over so as to permanently hold them in place.

INDUCTIVE TRANSMISSION.

Isidor Kitsee, Philadelphia, Pa., patents (No. 827,449; dated July 31, 1906; filed March 1, 1901; renewed Jan. 5, 1906; serial No. 294,788) telephony.

This is a telephone system in which the substation loops on a party line are in inductive relation to the main line. Instead of induction or repeating coils the inventor uses condensers.

SYSTEM AND APPARATUS FOR MEASURING TELEPHONE SERVICE.

Harold D. Stroud, Chicago, Ill., patents (No. 834,539; dated October 30, 1906; filed May 13, 1904; serial No. 207,876) and assigns to the Stroud International Measured Service Co., St. Louis, Mo., system and apparatus for measuring telephone service.

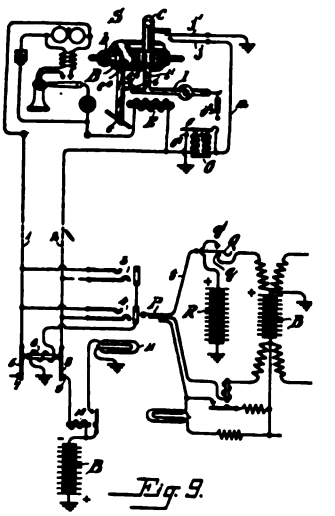
The inventor has provided a meter and system of operation whereby registration is secured upon the performance by the subscriber of an act which it is necessary for him to complete in order to secure the attention of the central office operator. He also provides a means whereby the operator at the central office can credit a call to a station after the registration of an unsuccessfully terminated call.

Fig. 9 shows a circuit diagram of a telephone line of a common type, with service meter properly connected at the sub-station. Modifications of the usual form of wiring in the central office apparatus consist in leaving contact 7 of cut-off relay 6 open instead of connecting it to ground; while in the cord circuit there is a modification in the keys, which will permit the connection to the tip strand of the live side of battery R, having a voltage of approximately 90.

Owing to the open contact at 7, the subscriber finds it necessary, in order to register a call, not only to remove the receiver from the hook, but also to depress lever *c* in the service meter. This connects ground to one limb of the telephone line at *j*, causing current to pass through relay *O*. This in turn causes the attraction of the relay's armature, closing contacts *o* and *o'*, at which a ground is put upon the line, which is only removed upon the actuation of the cut-off relay when the operator plugs in. The depression of the button *c* registers a call in the meter.

The meter is so constructed that if the lever *b* turns upon the operation of the push button *c* the call is not registered; *b* is normally prevented from rotating by the pressure of the bar *c*. If, however, the operator wishes to credit a call to the station she depresses the key, which puts the batteries R and B in series, subjecting the circuit to a potential of approximately 110 volts. This operates magnet *E*, which is inert to currents normally traversing the line from the 20 volt battery B, and also to alternating ringing currents.

The energization of magnet E causes the projection e^4 of the armature *e* to move into engagement with the latch *i*, where it is held. In this position of the armature a signal is displayed to the subscriber, and he knows, therefore, that he will receive his next call free. When the button C is next depressed for the purpose of sending another call, the arm *b* moves downward with the meter, the end e^4 of the armature *e* being out of its path. For this reason the meter does not register; but the meter



itself by pressing against the arm *i'* of the lever I releases the catch *i* and allows the armature *e* to spring into its normal position, so that unless the crediting magnet E is again operated the next call will be registered.

CALLING DEVICE FOR TELEPHONE EXCHANGES.

Frank A. Lundquist, Chicago, Ill., patents (No. 822,966; dated June 12, 1906; filed February 6, 1905; serial No. 244,344) a calling device for telephone exchanges.

In this invention is described a calling device consisting of a combination of springs, cams and gear wheels, adapted to be brought into action upon the rotation of a manually operable arm. The general result is that upon moving the pointer upon this arm to a given number on the wheel associated with the gear of the mechanism, and releasing it, the return movement causes as many impulses to flow over the line as were indicated by the pointer, thereby actuating a selecting mechanism at a distant point by the step by step process.

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QUERIES

NOISY LINES.—(790.)

We have a pole carrying trunk lines set on the opposite side of the street from a power company's wires. Most of the time our wires are quiet, but sometimes there is a heavy hum. We would like to know if there can be any chance that there will come up some condition that knocks out the transposition scheme, as we are unable to see why the lines should work all right at one time and not at another. B. F.

Almost all of your trouble is probably due to grounds. If your wires run through trees which are not properly trimmed it is almost impossible to avoid an occasional slight ground. If this occurs a very slight contact will give your lines a chance to pick up noise from the wires carrying current at a high potential, even though they are on the opposite side of the street.

If your lines are properly transposed to prevent noise at one time there should be none at others except from the cause stated. Test your lines very carefully and clear up any tree grounds, however slight, trimming the branches so that they cannot come on again.

TESTING REPEATING COIL EFFICIENCY.—(791.)

Please give me a good description of the best way to determine the efficiency of a repeating coil of the type used by most Bell companies in the cord circuits of common battery exchanges. A.

The efficiency of a repeating coil may be expressed in two ways. According to the first method it is determined by the percentage of energy applied to the primary side of a standard circuit in which the repeating coil is connected, which is given out on the secondary side. In power work it is in terms so derived that the efficiency of repeating or transmitting apparatus is usually expressed.

In telephony, however, the convention most commonly and conveniently used is that of expressing the equivalent of the coil in "miles of standard cable." The standard most frequently used is No. 19 gauge, copper wire cable, with paper insulation, having a capacity of 0.060 microfarads per circuit mile.

The equivalent of any coil is the number of miles of a twisted pair in a standard cable which must be introduced into the circuit to cause the same loss of energy as is caused by the introduction of the coil. For example, a very efficient coil is equivalent to only one-half mile of cable, and the loss is barely noticeable. Another coil may be equivalent to three miles of cable, and its loss is serious.

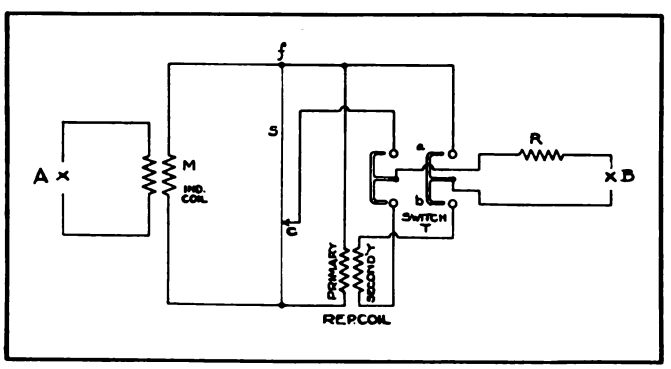

Fig. 791a.

Methods of determining efficiency by both systems may be explained in detail as follows:

In Fig. 791a A is the source of energy. In telephony this may be either a ringing generator or a transmitter and battery, depending upon whether the ringing or talking efficiency is desired.

M is any standard induction or repeating coil and is introduced merely to prevent direct current from flowing into the testing circuit.

S is a fine slide wire with a scale and C is the sliding contact. One hundred centimeters of No. 38 German silver wire of 30% or more nickel is a suitable size and material for the slide wire.

X is the repeating coil under test.

The switch T is multible pole, double throw, and may be of any type of double throw switch with two or four contacts that it may be convenient for the tester to use. The one shown in the drawing is of the mercury cup type in which the rocker arms dip into vessels containing mercury and thus complete the circuit.

B is the receiving apparatus and may be either a 1,000 ohm or 2,500 ohm ringer or a telephone receiver.

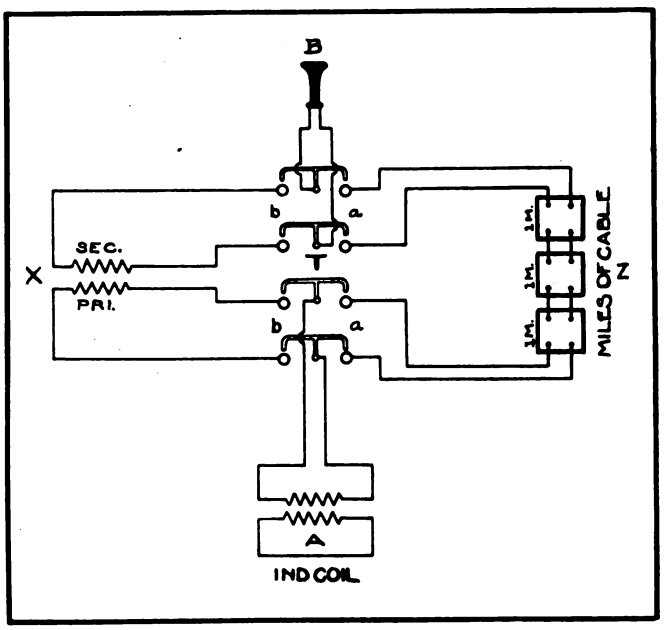

Fig. 791b.

For talking efficiency measurements one person talks into the transmitter at A. Another person, who must be isolated so that no sound transmitted directly through the air from A can reach him at B, listens in the receiver, throws the switch T alternately to positions "a" and "b" and moves the sliding contact C until the volume of sound heard is the same, whether the switch is at position "a" or "b." It will be found most satisfactory for A to repeat some one word or combination of letters or numbers first on "a" and then on "b," keeping the tone of voice and the loudness as nearly constant as possible.

If the length of the slide wire is 100 cm. and a balance is obtained with the slides at 78 cm. from the fixed end "f" the efficiency of the coil is 78 per cent.

It may be found desirable, in order to reduce the volume of sound, so as to make it easier to estimate, to introduce a few hundred ohms of non-inductive resistance at R.

The ringing efficiency is found in the same way except that A is a ringing machine and B a ringer. When the ring sounds the same on "a" and on "b" a balance has been obtained and the efficiency may be read from the scale.

To test a coil by the second method A talks as before, while B listens, throwing the switch "T" from "a a" to "b b" and putting in or taking out cable at "N" until a balance is obtained. The number of miles of cable at N is then the equivalent of the repeating coil and is the measure of its efficiency.

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I have no hesitancy in saying that the Gray Automatic Pay Stations are the most reliable and satisfactory of any that we have tried. We are using them exclusively. GEO. R. FULLER,
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FOR SALE—Telephone exchange and electric light plant in rapidly growing new town in South, with over 2,500 inhabitants; exclusive franchises on both, one for 50 years and one 99 years, dating from 1905; two properties earned over 15 per cent net first year; will sell cheap, as owners need money in lumber business. Address Box 714, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 714

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

WANTED—Whirlwind salesmen. Men who are resourceful, energetic and capable of commanding large salaries; the kind of men who are not accustomed to take "No" or "We will give you an order the next time you are here" for an answer. For such men we have good positions. We are willing that our salesmen should participate in the profit outside of the question of salary. Apply by letter or in person. Address S. A. Duvall, superintendent Long Distance Telephone Mfg. Co., South Bend, Indiana. 694

POSITION WANTED—As Assistant Manager or Superintendent of telephone exchange of two to eight hundred subscribers. Six years' experience, good habits and can give best of reference. Address Box 717, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 717

WANTED—Man to represent us in the State of West Virginia and surrounding states. One who is thoroughly acquainted with the Independent telephone movement in the state of West Virginia. Would prefer a man who has some knowledge of the telephone business and has influential friends throughout the state. Apply by letter or in person. Address, S. A. Duvall, superintendent, Long Distance Telephone Mfg. Co., South Bend, Indiana. 695

WANTED—Position by man and wife to take charge of telephone system. Man, technical education, seven years' practical experience in construction and management of local or common battery plants. Wife, five years' practical experience in operating and accounting. At present man employed as manager, wife as chief operator and accountant. Desire healthful location in Northwest States. Address Box 707, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 707

WANTED—Position by man having switchboard engineering experience; capable to take charge of maintenance or construction, either switchboard or line; can furnish best of reference. Address Box 713, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 713

WANTED—General management of telephone proposition. Able to qualify as thoroughly practical in all branches of "operating plant" and economical business management. Fully alive to "revenue" opportunities and the value of earned dividends. Will substantiate fully claims of ability and capacity by referring to present business associates and others for whom I have worked. Experience extending over fifteen years. Address Box 718, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 718

WANTED—Position as solicitor by young man with five years' experience with one of the largest Independent companies in middle west. Address Box 719, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 719

WANTED—First-class business manager to take charge of Independent telephone exchange in Ohio, one thousand subscribers. Prospect for increase in business and position good. Address Box 720, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 720

WANTED—Competent troublemen wanted by a large Independent telephone company of the middle east who are thoroughly familiar with the clearing of line and instrument trouble. Good wages to sober and industrious men who desire to make something of themselves; no other need apply. Address Box 721, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 721

AN expert on storage batteries, switchboard cables and heavy construction, with fourteen years' experience with Independent companies, now travelling for one of the largest Independent operating companies in the United States, wants a position as manager. Cannot consider less than $1,200 a year. Address Box 722, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 722

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Why expect "Gravity" to give loud, clear signals on your pay stations? It won't do it. We know and so do others that have tried it. We use a powerful lever action on

Baird Sheet-Steel Cash Register Pay Stations

Bulletins Nos. 36 and 51 tell you more. They're Free.

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

AMERICAN TIMINGS SYSTEM IN JAPAN.

A MOST interesting illustration of the progressiveness of the Japanese people is given in a sample record recently received from one of its customers by the Calculagraph Company, 1437 Jewelers' Building, New York. Above the complicated Japanese characters which form the lower part of the record are the three familiar stamps made by the calculagraph. The contrast between the use of a system of writing which is so old and laborious as that of the Japanese with so efficient and accurate a method of accounting as that made possible by the invention of the calculagraph makes the record so curious that the company has caused a number of reproductions to be made, and is distributing them.

HOUSTON & LIGGETT, Houston, Texas, have recently made arrangements to make up a large number of cross arm pins from live oak. The use of this wood is expected by the company to enable telephone companies to effect economies in material of this class. Their plant is equipped with facilities for turning out a large number of pins at short notice.

Fig. 1. Cable grip forming portion of Soseman pole splicing device.

MATHIAS KLEIN & SON, 87-89 W. Van Buren street, Chicago, Ill., have prepared a leaflet describing the "R. F." Soldering Copper. This is a new device which should be extremely useful for those who wish to use a small copper, which can be heated in a very short time without the use of a torch. As the company describes it, it should be of very practical utility in the outfit of both the central office and the outside troubleman. Full information can be obtained by writing to the company.

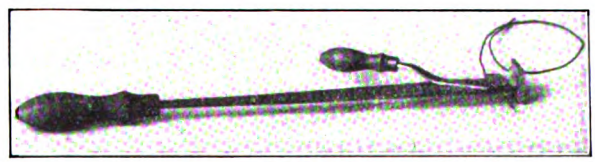

Fig. 2. Lever used for wrapping wire about pole.

THE DEAN ELECTRIC COMPANY, Elyria, Ohio, has recently secured contracts for magneto switchboards from the Home Telephone Company, Pasadena, Cal., 350 lines equipment; Home Telephone Company, Russellville, Ky., a 600 line board with Dean 4-party individual indicating ringing keys and duplicate harmonic converters; Central Telephone Company, New Castle, N. B., Canada; also other boards at Norman, Okla.; Rivesville, W. Va.; Waynesboro, Pa.; Springport, Mich.; Georgetown, Ohio; Youngstown, Ohio; McConnellsville, Ohio; Bellwood, Neb.; Llano, Texas, and a 5-section mahogany toll board for the Los Angeles Home Telephone Company, Los Angeles, Cal. These five sections are being placed in connection with the five old sections which are now in operation, which were installed by the Kellogg Switchboard & Supply Company.

Contracts have also been received for common battery multiple boards at Canton, N. Y.; Odessa, Mo.; Moorefield, Ohio; Benzonia, Mich.; Culpeper, Va.; Carbondale, Pa.; Mentor, Ohio; Charleston, W. Va.; Urbana, Ill., and Portland, Ore.

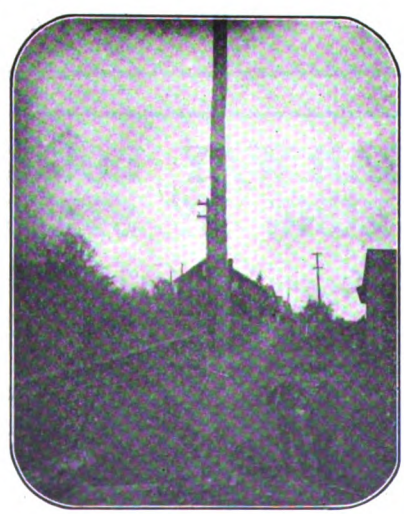

Fig. 3. Tripod used to support pole while defective base is being replaced.

MR. LOUIS MUHLHEIZLER in his excellent article in this issue describes the practical operation and method of connection into simplexed telephone circuits of an automatic telegraph repeater. This device is used as a booster for telegraph current on very long lines or where connection must be made from one line to another for the transmission of telegraph signals. As many readers of THE AMERICAN TELEPHONE JOURNAL will be interested in purchasing the necessary apparatus, which is patented, our Query Department will supply the address of the manufacturer to those inquiring.

SPLICING TELEPHONE POLES.

FOR those who believe that economical line repairing can be accomplished by splicing out old poles, Soseman's Pole Splicing Device presents many attractive features. It is intended to be used in such a way as to permit the replacing of the lower sections of poles which have become weakened by the action of moisture beneath the surface of the ground, while the sound upper part is retained. Mr. J. D. Soseman, of Monroe, Wis., the inventor of the device and method of appliciation, states that material suitable for the lower stubs can be readily obtained and set in place with very small expense, through his invention, and that therefore the depreciation cost from a telephone has may be very much reduced.

In splicing a pole by the method he has invented, it is necessary to support the upper portion of the pole while the lower, defective part is cut off and removed from the the ground. In Fig. 1 is shown a cable grip, constructed in such form as to so securely grasp the pole as to support not only the weight of the pole itself, but whatever load of wires it may carry. The pole is held up by three legs, arranged to form a tripod when attached to metal blocks which are supported by the cable grip. The legs are formed in two sections of metal tubing, which are adjustable in length by a telescopic arrangement. The lower section of each leg is provided with a jack or lifting screw, which in turn is connected by a ball and socket joint with a base block or shoe which rests on the ground. It is evident that this device may be set in position, and after the pole has been sawed off, the turning of the lifting screws will raise the upper portion a sufficient amount to enable the removal of the defective piece of wood, and the substitution of a new sound block. For wrapping a splice the lever shown in Fig. 2 may be used, and by its aid the work may be very quickly accomplished. The inventor of the supporting apparatus

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One Extra Button

down at the bottom of the front plate enables you to connect your instrument direct to the city exchange. The other buttons are for intercommunicating service. The city exchange can also call up any station on your system.

Automatic reset—the station is left in condition to be called after using.

Trunk Button

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STANDARD SIZES:

8	intercommunicating	buttons,	1	exchange	button
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100% CHEAPER THAN BRANCH EXCHANGE.
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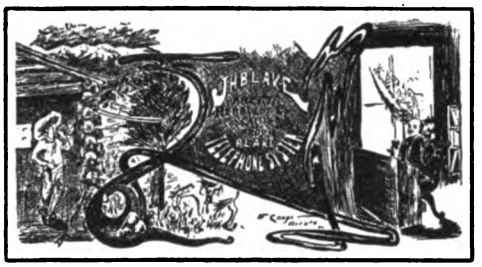


Arcata, Cal., July 8, 1906.

The Trumbull Elect. Mfg. Co.,
Plainville, Conn.

Gentlemen:

Your bill for switches came to hand today but the switches came several days ago, and am pleased to say that they were very satisfactory indeed.

I immediately put them on to a switch board of my own design, and it is about the neatest thing I ever saw for a small place.

It is so simple and easy to operate that a child can learn in five minutes to work it.

Thank you for your promptness. You will hear from me again.

Yours very truly,

Dist. J.H.B.
M.

J H Blake
Box 229

Check enclosed.

the difficulty of securing a reliable switchboard at small expense by making one from

Trumbull Switches.

Read the letter.

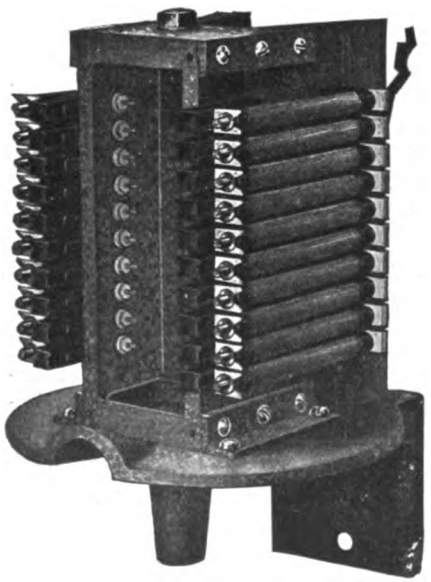
Write for directories and prices.

TRUMBULL ELECTRIC MFG. CO.
PLAINVILLE, CONN.

Cook Terminals

and Junction Boxes

are made to fit every possible condition. If you are doing reconstruction work or are putting in an all-cable plant specify COOK terminals, or order direct. Twenty styles in all sizes and at all prices. Equipped with the best and most reliable protection.



Type S. W.—Inside, Showing Cable Clips.

Better Hurry Your Construction Work Before Winter Sets In.

Write for Complete Catalogue with Prices, and Ask for Plans for Your Cable Lay-Out.

Frank B. Cook.

238 W. Lake St., Chicago, Ill. Manufacturer

Cook Combined Terminal and Junction Box.

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and winding lever claims that by their use a splice can be made by three men in between one and a half and four hours, depending on the surroundings and the size of the pole. Full directions for using the apparatus may be obtained by writing to the inventor.

GEORGE W. WILDER.

PROF. GEORGE WALKER WILDER, Ph.D., has severed his connection with the Armour Institute of Technology as Professor of Telephone Engineering and opened an office in the Monadnock Block, Chicago, as a telephone engineer. During the past three years Dr. Wilder has built up a department of telephone engineering at Armour which has attracted wide attention. He has also been engaged in several important telephone investigations and has made many improvements in methods of electrical testing, especially as applied to telephone apparatus.

In 1896 he graduated from the University of Wisconsin, and the following two years were spent as instructor in the Physics laboratory in the same institution. Two years were spent in special electrical studies in the National Polytecknium of Switzerland at Zurich, and after graduating with the degree of Doctor of Philosophy from the university there, he returned to Wisconsin and took charge of the courses in Electrical Measurements and Engineering Physics. Three years later, in 1903, Dr. Wilder accepted a position at Armour Institute of Technology, where he devoted his time to building up the telephone courses. He is the author of the book "Telephone Principles and Practice" and has contributed several articles to the technical press.

G. W. Wilder.

FRANK B. COOK, 238 West Lake street, Chicago, Ill., is calling attention to the behavior of his No. 10 Protector, furnished to the Kinloch Telephone Company, St. Louis, for its new exchange. The order was for 16,000 pairs, the largest single protector board ever installed.

The No. 10 protector was designed especially for the Kinloch Telephone Company and had to be designed and manufactured in a hurry. Under such unfavorable circumstances troubles without number might have been expected to spring up in the most unlooked for places. As a matter of fact, however, Cook's No. 10 protector is said to have developed none of the possible eccentricities.

The protectors were installed by the Stromberg-Carlson Telephone Manufacturing Co., and when the cut-over was made, only nineteen cases of trouble, all told, were found in the entire 16,000 pairs. Only two of these cases of trouble were spring troubles, due to slight faults in the assembling. Mr. Cook is considerably elated by this record. He is now in position to fill orders for the No. 10 Protector and will mail a new descriptive circular to any inquirers.

THE EWING-MERKLE ELECTRIC COMPANY, 1106 Pine street, St. Louis, Mo., has, as usual, made its November number of the "Everbest Magazine" very interesting and attractive. The features which will appeal especially to the telephone men are a discussion of selective party lines, which makes clear several points about the use of biased bells, and a page devoted to telephones on farms. The book also contains interesting general electrical information. A list of the words for which a simplified spelling has been adopted by the United States General Printing Office is given in the back of the book.

THE S. H. COUCH COMPANY, Boston, Mass., reports that during the past year its business for apparatus for intercommunicating systems and other classes of telephone work has been extremely good. The company manufactures and sells a very complete line of goods, including the well-known Couch automatic switch, telephones for all classes of work, and other apparatus for use in both exchanges and interior systems. Bulletins descriptive of this apparatus may be obtained from the company upon request.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Rochester, N. Y., reports the following contracts for switchboard sales recently closed: Indianapolis Telephone Company, Indianapolis, Ind.; Rossville, Telephone Company, Rossville, Ind.; Liberty Telephone, Liberty, Mo.; Chippewa County Telephone Company, Holcomb, Wis.; Inter-State Co-operative Telephone Company, Palouse, Wash.; National Telephone Company, Wheeling, W. Va.; Southern Pacific Telephone Company, Oakland, Cal.; Dr. H. H. Pugh, Armstrong's Mill, O.; Drakeville Mutual Telephone Company, Drakeville, Pa.

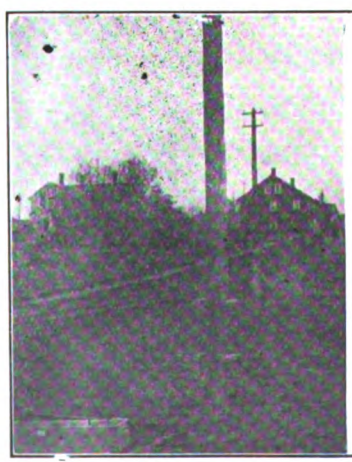

Fig. 4. Parts of Soseman pole splicing device temporarily secured by clamp.

Fig. 5. Spliced pole after completion of work.

Fig. 6. View of broken pole.

THE HOLTZER-CABOT ELECTRIC COMPANY, Boston, Mass., and 395-397 Dearborn street, Chicago, Ill., is manufacturing a line of vibrating bells, which are extensively used in intercommunicating systems.

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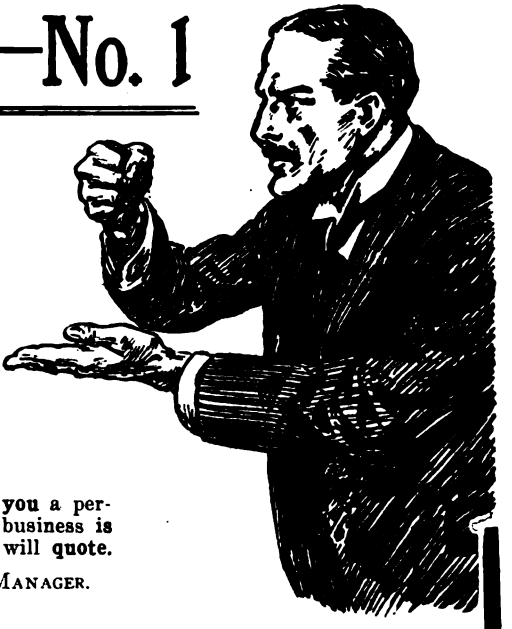
Talks With The Buyer—No. 1



Sheldon says: "I have known men who were so good that they would not say 'damn' for a dollar, but could go Ananias one better any old day when it comes to a trade." That is about your opinion of **every telephone salesman** who comes to see you, and **every house** that **advertises.**

The buyer thinks that he has to **discount** almost everything that is said nowadays owing to the **highly worded** advertising, but I want you to get out of that habit of discounting what we say **right now.**

I am not talking to you if you are buying from us; it is not necessary to tell **our** customers anything about our business methods. **I am talking to the prospective buyer,** who **needs** construction material and apparatus now and who wants to secure the best at the smallest possible outlay.

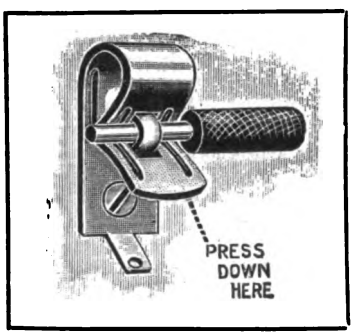
Our business is growing with leaps and bounds through the fact that we are giving **our** customers a **"Square Deal"** all around. It is not necessary for us to secure new customers every month to make up for the **old** ones lost.

Answer this advertisement **to-day** telling your **plans** and let **me** write **you** a personal **letter** on this subject. Let me tell you why our method of handling business **is better** and how it **is different.** Send the list of your requirements and I will **quote.** It is a **story quickly** told and **in pocket** for you.

THE SALES MANAGER.

CENTRAL TELEPHONE & ELECTRIC CO., THE UP-TO-DATE TELEPHONE HOUSE 2131-33-35-37 LUCAS AVENUE **ST. LOUIS, MO.**

A SURPRIZINGLY QUICK AND RELIABLE CONNECTION is secured when the Fahnestock Spring Binding Post is used. The spring is deprest and the stript, straight end of the wire is inserted thru the loop without bending, thus retaining the full strength of the conductor and preventing it from breaking at the post. ¶ We make them in several styles for use on distributing boards, etc. ¶ Your dealer will supply your dry batteries fitted with these posts without extra charge. ¶ Insist on getting them. Catalog and Sample Post Free.



FAHNESTOCK ELECTRIC CO.
129 Patchen Avenue Brooklyn, N. Y.

THE FINAL STROKE IN TIMING TOLL MESSAGES WITH

The Calculagraph

is shown in the illustration. The operator is pulling the lever forward to print the arrows which indicate the elapsed time. This instrument determines the overtime charge exactly.

It Makes No Clerical Errors. ***Write for Catalogue***

CALCULAGRAPH CO.
1437 Jewelers' Building New York City
Agents for Canada: Northern Electric and Manufacturing Co., Montreal.

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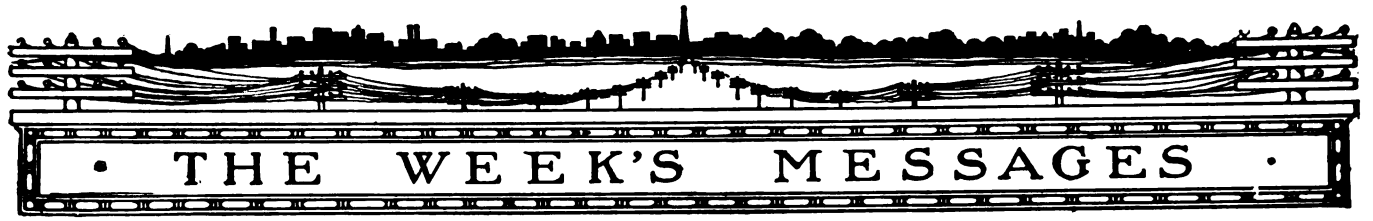

NEW COMPANIES.

EUCLID, MINN.—The Euclid Rural Telephone Company has been organized, and has already constructed twenty-three miles of its system.

UPPER JAY, N. Y.—The citizens of Upper Jay are considering the organization of a new telephone company to construct a line from Upper Jay to Plattsburg.

PATTON, PA.—The Northern Cambria Telephone Company, of Patton, Pa., has been incorporated with a capital stock of $5,000.

WEISSPORT, PA.—An attempt is being made by the citizens of Franklin township to organize an Independent telephone company to construct a line to Weissport, Pa. Among those interested in the project are John E. Hahn, D. H. Lesber, W. B. Adams, E. W. Driesbach, Thomas LaRose and Harry Rickert.

HARTFORD, W. VA.—The Longdale Independent Telephone Company, of Charleston, with chief works in Hartford, has been incorporated and will build and operate a telephone system from Point Pleasant up the Ohio River, and through many counties in West Virginia and Ohio. The capital stock is placed at $15,000, of which $4,000 has been paid in, and the incorporators are C. B. Rickard, A. M. Belcher, W. F. Carter, G. C. Rippelse and W. R. Bower, all of Charleston.

CASHTON, WIS.—The Cashton Telephone Company, Cashton, Wis., has been incorporated with a capital stock of $10,000. The incorporators are Granville Hall, Frank E. Steele and Jorgan A. Moen.

HIGHLAND, WIS.—Articles of incorporation have been filed by the Pompas Pillar Telephone Company, of Highland, Iowa County, Wis. The company will start business with a capital stock of $332.00, and among the incorporators are Chris Blabaum, William A. Carr, N. P. Schwingle, H. W. Schwingle, Andrew Draves, Nels Nelson and Joseph Pink.

FRANCHISES.

CHICAGO, ILL.—Another application for a franchise in Chicago has been made by Arnold Kalman, who is identified with several Independent companies in the west, among which is the Home Company of Kansas City.

BRAINARD, MINN.—The Council of the City of Brainard has granted a franchise to Horace F. Mann to construct and operate a telephone system in that city.

NORWOOD, O.—Application has been made by the Cincinnati Independent Telephone Company for a franchise to construct and operate a telephone system in the city of Norwood.

READING, PA.—Permission has been granted by the Board of Works to the Consolidated Telephone Company to construct lines in Reading.

GUELPH, ONT., CAN.—It is quite probable that the Canadian Telephone Machine Company, which already has plants in Peterboro, Brantford, Brandon and other cities, will apply for a franchise at Guelph.

FINANCIAL.

FORT WAYNE, IND.—The Home Telephone Company has added 2 per cent. to its customary semi-annual dividend of 1½ per cent. The capital stock of the Home Company is $250,000, common, on which this dividend is to be paid (2½ per cent. semi-annually), and this is above and apart from the stated 3 per cent. semi-annual cumulative dividend due January 1 next on the preferred stock.

RISING SUN, IND.—The Ohio River Telephone Company, of Rising Sun, has increased its capital stock to $75,000.

SUNBURY, O.—The capital stock of the Sunbury & Galena Telephone Company has been increased from $25,000 to $50,000.

SPOKANE, WASH.—The Interstate Telephone Company, of Spokane, has increased its capital stock from $20,000 to $100,000. The increased capital will be used for the purpose of extending the company's lines.

COMBINATIONS.

NOME, ALASKA.—Articles of agreement have been signed for the consolidation of the Seward Co-operative Telephone Company and the Alaska Telephone & Telegraph Company, and the affairs of the two companies will be conducted under the management of A. E. Boyd, manager of the Alaska Telephone & Telegraph Company. The new company will have a capitalization of $300,000, and directors will be named from the stockholders of the two old corporations.

LITTLETON, ILL.—A deal has recently been consummated by which the Western Telephone Company and the Grange Telephone Company will consolidate their lines and business at Littleton and operate as one company.

FLORA, IND.—Another change has been made in the ownership of the Flora Telephone Company, and the plant is now owned by F. P. Lyons, president; W. E. Callane, secretary; J. V. Bright, treasurer; R. R. Bright, J. V. Bright and Warren Knapp, directors.

PRINCETON, IND.—The Independent Long Distance Telephone Company, of Princeton, which has just completed a direct line to Louisville, establishing a new trunk line to eastern cities, is to be taken over by the Home Independent Telephone Company, in which Indianapolis, Evansville, Vincennes and Princeton capitalists are interested.

DOWS, IA.—A one-half interest in the Jameson Telephone Exchange has been secured by F. H. Peterson, and it is his intention to supervise the mechanical part of the business.

MOUNT STERLING, KY.—The East Kentucky Telephone Company, of Mt. Sterling, Ky., with lines in Mt. Sterling and a great part of the country about that city, has been acquired by the People's Independent Ice and Coal Company, of St. Louis. The new owners expect to rebuild the plant and make other improvements and extensions.

FREMONT, MICH.—Three telephone exchanges in Mahaska County have been acquired by Messrs. W. E. and H. L. Jennison, and the business of these exchanges will be superintended from Fremont.

TICONDEROGA, N. Y.—The Schroon Lake Telephone Company has recently passed into the hands of the Ticonderoga Home Telephone Company, which has been working in competition with the Bell company at Ticonderoga for some little time. It is the intention of the Ticonderoga company to make many changes and improvements in the newly acquired system. The plant is to be made an all-metallic circuit, and a trunk line will be built from Ticonderoga to Schroon Lake.

DALLAS, TEXAS.—The plant of the Commerce Telephone Company has been acquired by S. M. Redburn, of Dallas, Texas.

SUFFOLK, VA.—A meeting is to be held at Suffolk, Va., by the stockholders of the Nansemond Telephone Company and the Virginia-Carolina Telephone Company to consider a proposition to merge the two corporations.

ELECTIONS.

YOLO, CAL.—The following officers and directors have been elected by the Yolo & Blacks Telephone Company: President, W. W. Vickroy; secretary, Lindsay Morris; treasurer, B. Borach; directors, W. W. Vickroy, Lindsay Morris, C. Hatcher, E. L. Pockman and B. C. Howard.

ATWOOD, ILL.—The Atwood Telephone Company has elected the following directors: C. B. Moore, W. E. Means, Henry Landis and J. L. Stallsworth.

HIGHLAND CENTER, IA.—The following officers have been elected by the Highland Mutual Telephone Association: President, O. C. Stevens; vice-president, A. J. Rogers; secretary, Mr. Utterback; treasurer, Geo. Bane.

JAMES, IOWA.—At a recent meeting of the James Mutual Telephone Company the following officers were elected: President, Grant Musser; secretary, Frank Woolworth; treasurer, Cyrus Atwood. The following board of directors was also named: Hans Olsen, James Woolworth and Claus Junck.

ASHLAND, ME.—The board of directors of the Independent Telephone Company of Ashland is composed of Fleetwood Pride, president of the company; Robert Boyd, vice-president; W. R. Dresser, secretary; A. J. Wetmore, treasurer; J. A. Brown, S. Friedman, L. O. Ludwig, E. L. Cleveland, Geo. B. Dunn and Clarence Pierce.

FULTON, N. Y.—The Oswego County Independent Telephone Company has elected the following officers: President, H. Lester Paddock; vice president, L. W. Emerick; treasurer, J. R. Sullivan; secretary and manager, M. S. Powell.

JAMESTOWN, N. Y.—The following officers have been elected by the Conewango Valley Telephone Company: President, E. W. Storms; vice-president, George W. Rood; treasurer, H. S. Sweetland; secretary, Hugh

SOUTH CORINTH, VT.—At a meeting recently held at South Corinth, the Eastern Vermont Telephone & Telegraph Company elected the following directors: C. A. Washburn, South Corinth; P. H. Darling, Corinth; A. T. Smith, West Topsham; Charles Mills, Orange; C. C. Coburn, West Fairlee, E. C. Poole, A. H. Batchelder, F. W. Thurber and H. M. Dickinson.

MISCELLANEOUS.

BRISTOW, IA.—The Corn Belt Telephone Company suffered a $500 loss during a recent fire at Bristow.

COUNCIL BLUFFS, IA.—The Independent Telephone Company has made final arrangements for the connection of its Council Bluffs and Iowa lines with the Nebraska Independent systems. Connections will be made with the long-distance office of the Independent companies in South Omaha and through that switchboard with the Plattsmouth Telephone Company, the Independent organization operating in the South Omaha commercial field. This arrangement will connect up about 100,000 Independent telephones in

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THE STANDARD
"HEMINGRAY"
All With The
"Patent Drip Petticoats"

The Hemingray-Glass Co., Office, Covington, Ky. Factory, Muncie, Ind.
ESTABLISHED 1848

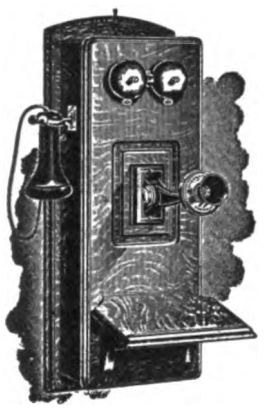
To the Management of
LARGE EXCHANGES NEW OR OLD COS.
We Solicit Your Contracts for
Telephone Accounting and Filing Systems
and Auditing Work

Our experts will take the entire responsibility of furnishing our perfected copyrighted Blanks, Forms, Records and Supplies at lowest market prices, install the system and educate your office force.

N. B. Services reasonable. Correspondence solicited. Give size and scope of your company and present office conditions.

THE Edwards-Hine Co.

TELEPHONE SYSTEMATIZING DEPT.
5 and 7 PEARL STREET (EAST), GRAND RAPIDS, MICH., U. S. A.



Our Price is Right

1st
TELEPHONE MADE

with all connecting wires, binding posts and terminal screws fully concealed

To Prevent Trouble

and with no exposed metal parts in the circuit to

Avoid Danger

from lightning while using the instrument. Send us your inquiry and we will "SHOW-U" at our expense an interesting proposition.

INTERNATIONAL TEL. MFG. CO.
Harrison and Clinton Sts., Chicago

John Wanamaker says: "If there is one enterprise on earth that a 'quitter' should leave severely alone, it is advertising. To make a success of advertising one must be prepared to stick to it like a barnacle on a boat's bottom. He should know before he begins it that he must spend money—lots of it. Somebody must tell him, also, that he cannot hope to reap results commensurate with his expenditure early in the game. Advertising doesn't jerk: it pulls. It begins very gently at first, but the pull is steady. It increases day by day and year by year until it exerts an irresistible power."

MICHIGAN WHITE CEDAR POLES

In addition to the several yards we have had in the past, we wish to call your attention to our new yard which is located at Escanaba, Mich.

The acquisition of this new yard enables us to ship poles by all railroads or by the lake routes, thereby enabling us to give the best delivered prices.

The location of our new yard makes it easier to secure cars, thus facilitating prompt shipment.

In many cases poles can be shipped by car-ferry, making possible a great saving in cases of shipment to Eastern points.

We are wholesalers exclusively, shipping in car lots only.

Write us for delivered prices and "Pole Booklet No. 8-A." Yours for the asking."

KELLOGG SWITCHBOARD & SUPPLY CO.
CHICAGO, ILL.

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THE WEEK'S MESSAGES

Iowa and Nebraska. The Council Bluffs Independent company's system now covers the western half of the State.

FORT RECOVERY, O.—During a recent fire at Fort Recovery, the Home Telephone Company's exchange was completely destroyed.

CORYDON, PA.—The headquarters of the Kinzue & Corydon Telephone Company, recently incorporated at Warren, are at Corydon, Pa. The company is chartered for $10,000, of which $3,500 has been paid in. Connections will be made with the Union Telephone Company of Erie for long distance service. The officers are O. C. Sparks, president; R. H. Duntley, vice-president; A. W. Reeves, secretary and treasurer.

PERSONAL.

HUGH E. ELWELL, Columbus district operator for the United States Telephone Company, has been promoted to the position of traffic manager for the company, with headquarters at Cleveland, O. E. D. Kramer, formerly traffic manager, retires to go into business for himself.

J. E. McGILLIVARY, who has for some time been district manager of the Pacific States Telephone and Telegraph Company at Walla Walla, Wash., has recently given up that position and will hereafter devote his time to general telephone engineering and construction. Mr. McGillivary is one of the best known telephone men in the Northwest. He has for eleven years been connected with the Pacific States Telephone and Telegraph Company, with which he has held important positions at various points on the coast. His experience qualifies him to be thoroughly successful in his work as a telephone engineer.

H. R. SYKES, for several years a district manager of the Local Telephone Company of Bellevue, Ohio, will assume the management of the Norwalk exchange of that company.

New Construction in the Field

BERTHOUD, COLO.—The Independent Telephone Company is making many improvements and extensions in its system at Berthoud.

LOMAX, ILL.—The lines of the Farmers' Telephone Company are being extended in Lomax.

MORTON, ILL.—Considerable cable is to be strung in Morton by the Tazewell County Telephone Company.

PANA, ILL.—Among the many extensions and improvements planned by the Christian County Telephone Company, is the stringing of about three miles of cable and the installation of new switchboards.

URBANA, ILL.—It is the intention of the Home Telephone Company to rebuild its entire system in Urbana.

ARDMORE, I. T.—The Chickasaw Telephone Company has constructed a line from Cornish to Dixie and Loco.

CHICKASHA, I. T.—The local telephone company at Chickasha is installing a new switchboard, and also expects to overhaul its lines, and put its system in first class condition.

IDA GROVE, IOWA.—The Ida County Farmers' Mutual Telephone Company, of Ida Grove, has under construction in the southern portion of Ida County over one hundred miles of farmers' lines which will connect with its system at Ida Grove.

KEOKUK, IA.—It is estimated that the Mississippi Valley Telephone Company will expend $100,000 in the rebuilding of its system at Keokuk, the installation of a central energy switchboard and the construction of a new office building.

SIOUX CITY, IOWA.—The New State Telephone Company's plans for improvements include a line to connect the towns along the line of the Omaha road in Nebraska, beginning at Dakota City. This line will connect Emerson, Pender, Bancroft, Lyons, Oakland, Craig, Tekamah, Herman, Blair and Omaha.

DIAMOND SPRINGS, KAS.—The Farmers' Telephone Company has constructed a line from Diamond Springs to Strong City, and will also establish connections with Council Grove.

McLOUTH, KAS.—The McLouth Telephone Company contemplates the erection of a line to Stanwood.

FORT KENT, ME.—It is the intention of the Aroostook Telephone Company, under the direction of L. S. Black, of Houlton, to build a line from Fort Kent to Ashland.

COLD WATER, MICH.—The Southern Michigan Telephone Company, an Independent system, has purchased a brick block at Cold Water and expects to expend $80,000 on a telephone system at that point.

GRAND RAPIDS, MICH.—The Citizens' Telephone Company, of Grand Rapids, Mich., expects to construct a copper line from Traverse City to Elk Rapids, a distance of about twenty-five miles, and in connection with the Swaverly Telephone Company a copper line from Greensburg to Kalkaska, a distance of twenty miles. The company now has in use about 8,000 telephones.

EVELETH, MINN.—A new line is being constructed at Eveleth by the Mesaba Telephone Company.

NERSTRAND, MINN.—The Tri-State Telephone Company is erecting a new line at Nerstrand.

BEATRICE, NEB.—A new switchboard is being installed by the New Home Telephone Company at Beatrice. The company is also making other improvements in its system.

LINCOLN, NEB.—New lines have been constructed by the Western Telephone Company to Falls City and Humboldt, giving Lincoln direct connection with Kansas City.

WYMORE, NEB.—The New Home Telephone Company is about to complete the installation of its system at Wymore.

ARCADE, N. Y.—The Erie-Wyoming Telephone Company, in order to take care of its increasing business, has been obliged to install another switchboard at Arcade.

ARKVILLE, N. Y.—The Delaware & Eastern Telephone Company has constructed a trunk line to Arkville, at which point connections across the State will be secured by joining with the Standard Company of Kingston, which owns lines to Arkville.

COHOES, N. Y.—The lines of the Home Telephone Company are being extended in Cohoes.

HURLEYVILLE, N. Y.—A telephone line is being constructed connecting Hurleyville, Divines and Centreville Station.

NORTH TONAWANDA, N. Y.—The Niagara County Home Telephone Company has installed a modern system in the Tonawandas, which replaces the old magneto system. A new exchange building has also been placed in service at North Tonawanda.

SOUTH HARTFORD, N. Y.—The Granville Telephone Company is extending its lines in the direction of South Hartford.

CLEVELAND, O.—The Cuyahoga Telephone Company has secured a site in the East End, upon which will be erected a new telephone exchange with a capacity for about 6,000 telephones. The Hawood exchange is also being rebuilt.

STOCKPORT, OHIO.—The Home Telephone Company and the People's Telephone Company are rebuilding their direct line from Stockport to McConnellsville, which will insure better service to the patrons of both companies.

MYRTLE POINT, ORE.—A farmers' telephone line is being constructed from Norway to Myrtle Point.

EMAUS, PA.—It is the intention of the Consolidated Telephone Company to establish suburban branch exchanges at Emaus and Danielsville. The exchange at Emaus will have an immediate capacity of 60 telephones, capable of being increased to 100. New lines will be built from Slatington to the Danielsville exchange, which will have a capacity of 50 telephones.

NICHOLSON, PA.—New lines are being constructed in Nicholson by the Commonwealth Telephone Company, as well as in Lathrop and Brooklyn.

POTTSVILLE, PA.—The private telephone system of the Philadelphia & Reading Coal & Iron Company is being extended.

SUEDBERG, PA.—A new telephone line is to be constructed from Suedberg to Pinegrove through Exmore.

TREVORTON, PA.—A new telephone line is being built between Trevorton and Shamokin.

SAN ANGELO, TEXAS.—The San Angelo Telephone Company is extending its system in many directions. Lines are being built to Wall, and from Robert Lee to Valley View.

BENWOOD, W. VA.—The National Telephone Company, of Wheeling, W. Va., is rebuilding its system at Benwood.

BROOKLYN, WIS.—The Brooklyn Telephone Company is at work on its telephone system.

MINNEAPOLIS, MINN.—The Twin City Telephone Company has decided to place the police and fire alarm signal wires in conduits.

JERSEY CITY, N. J.—The Coast Line Telephone Company, headquarters 32 Broadway, New York, has applied for permission to place conduits in every street in Jersey City.

CLEVELAND, O.—The Cuyahoga Telephone Company will shortly begin the construction of a conduit system for its proposed East End exchange.

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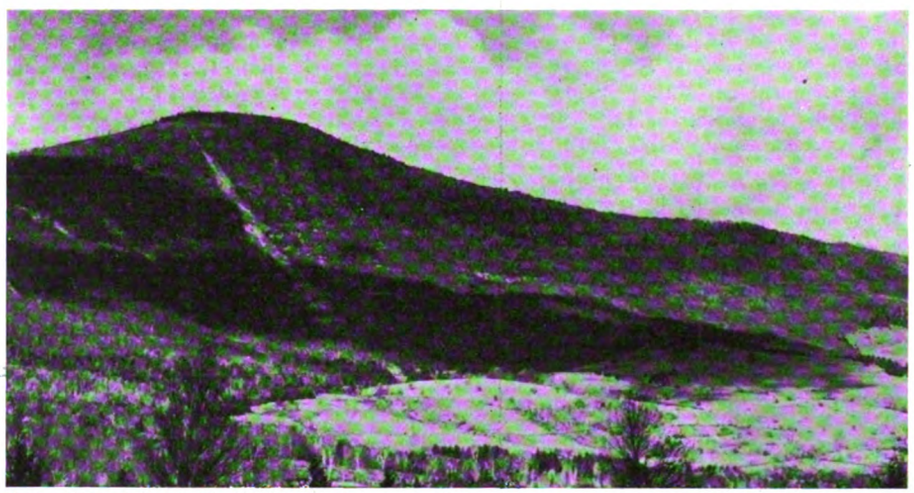
A Mountain Telephone Line in Massachusetts

By Robert G. White.

MORE notable proof could not be found of the universal acceptance of the telephone as one of the most essential modern utilities than in the lack of surprise shown by those who find it installed in the small house on the summit of Graylock, the highest mountain in Massachusetts. Another point is emphasized, too, by this installation in a location which yet belongs to the class not made familiar to all telephone men. That is the frequency with which persons living under present conditions demand communication with their relatives and associates in various undertakings, the constantly increasing range of distance over which these communications are held, and the part the telephone itself has taken in developing the more firmly knit social structure which results from the gratification of this desire to learn things at once from the spoken words of those who are far away.



From photograph by W. H. Stedman.

Mt. Graylock, the Highest Mountain in Massachusetts. A Telephone Line Has Recently Been Carried to the Summit Along the Landslide Path Visible in the Picture.

These may be the broad and general things, of which this telephone, isolated so high in the air, is a sign; coming down to details of its daily use—those which were foreseen and led to its being placed in the house on the summit, and those which have come to light since its installation, it is found that a classification of the calls will show no less than three special uses of the line, which are created by the very novelty of its surroundings.

From the neighboring cities of North Adams and Pittsfield, and Williamstown as well, many visitors go to the top of Graylock, from which a remarkably fine view of hills and valleys in all directions is obtainable. Not a few of these people wish to see the sun rise from the summit, but as accommodations at the house are limited much confusion is avoided by making all arrangements for staying over night by telephone. This is known in all the hotels, and communications of this sort from their instruments to the one on the summit are frequent.

Reports from those in immediate charge to the state commission which controls the mountain as a reservation, and weather reports forwarded to the newspapers each morning also form an

From photograph by W. H. Stedman.

Construction Crew Which Built the Graylock Summit Line.

Iron Pipe Carrying Rubber Covered Wires Up the Landslide Path.

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important proportion of each day's messages. By the general public who find themselves on the mountain this telephone is used for calls to homes or hotels or for almost any one of the dozens of other ordinary messages which are commonly sent from a public pay station. It is almost needless to say that the delivery of all household supplies is arranged by wire.

To connect the instrument to the general system of the New England Telephone & Telegraph Company, which built the line, there was undertaken a novel and extremely interesting piece of construction work. A consideration of all the local conditions led to the conclusion that the most satisfactory and economical results could be obtained by running the line by means of insulated wires in an iron pipe down the course taken several years ago by a landslide which carried away trees and soil, leaving a path of bare rock from a point very near the top to the foot of the steepest slope of the mountain, on the side nearest the town of Adams and at an elevation of only a few hundred feet above that village. Over the comparatively gentle slope of the intervening two miles the wires could be carried on ordinary poles. Foreman of Construction B. B. Britt, who was in charge of the running of the line, had the iron pipe which was to protect the wires down the steep incline carried to the summit. A four-horse team took care of the transportation of this and other material over the good carriage road from No. Adams in two trips. Work was started at the top of the mountain. Holes were drilled in the rocks, and in these were set eye bolts, thoroughly secured by lead run in when melted. The men on the construction crew coupled up the pipe in sections about 150 ft. in length, laying them out upon a small flat opening at the top of the mountain. As each one was assembled it was lowered and set in place on the rocks. Whenever bends were necessary they were made by the men when they fastened the pipe. Drillings in the rock were made as the sections were lowered. In placing the wires the method of procedure was to run a fish line through the pipe, and to draw through with this the two single No. 14 copper wires, which were used as conductors. The pipe was then coupled to the section above. It was fastened by wrapping a bare iron wire about it, and soldering the wire both to the pipe and to an eye bolt. As these eye bolts were located at frequent intervals along the pipe, all danger of the wholearrangement breaking loose and sliding down hill was avoided, as the weight and tension are very evenly distributed.

Pipe for Carrying Telephone Wires at a Precipitous Portion of the Mountain Side Ascent.

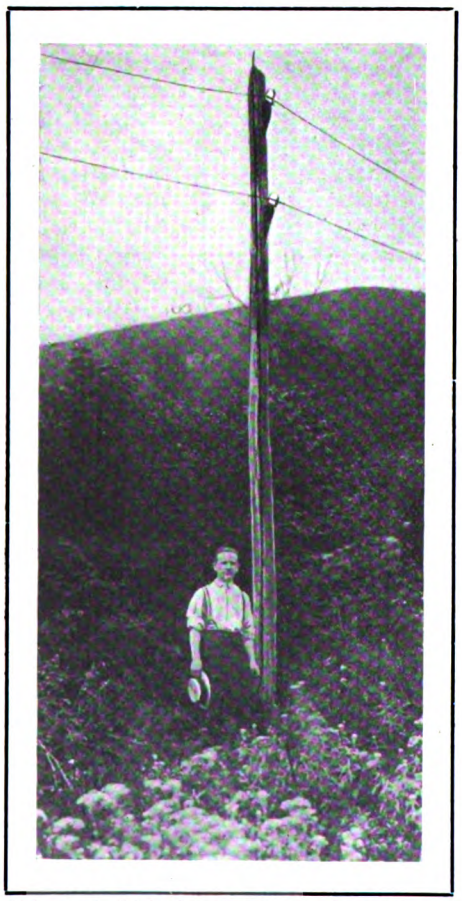
The conductors in the pipe are of the usual type of rubber covered copper wire, having an insulation resistance of 2,500 megohms. There is no splice in the wire at any point within the pipe. In running this wire through, reels were set at the top of the mountain, and it was found that after a certain amount had been pulled through it was no longer necessary to use the fish line, as the weight of the wire itself was sufficient to push the end through a section of pipe. In order that a test might be made, in case any trouble should occur in the wire, without pulling out the entire length, a hand hole was inserted in the pipe at a point about about half way up the mountain.

At the foot of the steep incline the pipe ends, and the wires are carried up the first pole to make connection with the open wire line, as shown in the illustration. The pipe is grounded here, the ground consisting of 150 ft. of 7 strand guard wire set 8 ft. deep in the ground. A spring which was found at this depth keeps the ground permanently moist. In order to provide further protection against damage from lightning, which at times is very severe upon this mountain side, it was considered desirable to ground every other pole for a distance of 3,000 ft. out into the open field below the end of the pipe. Each ground consists of a loose coil of 7 strand guard wire, as was described for the one at the foot of the steep incline. This makes in all 12 separate grounds, each of them in earth which is kept moist by a spring, or water which flows under ground.

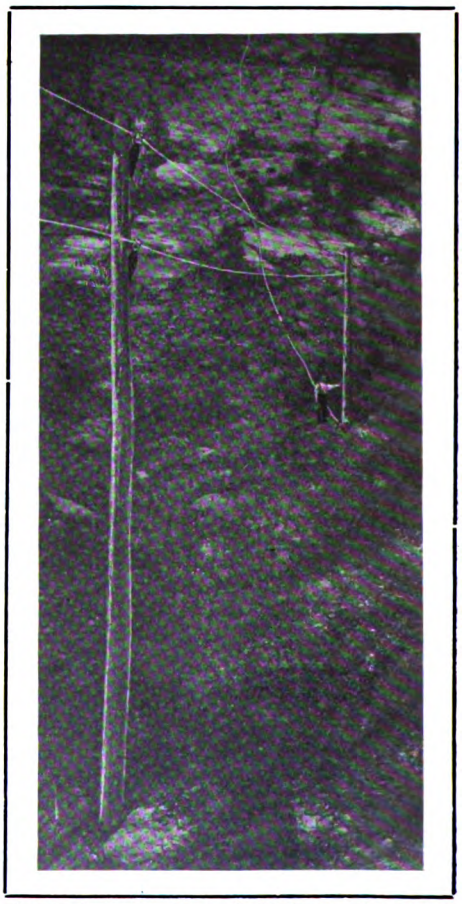
Except for these frequent grounds, and the fact that a small portion of the right-of-way is through a path from which trees and underbrush have been completely cleared to a width of several feet, this line differs in no respect from an ordinary pole line, with wires strung on brackets, running through a field.

For connections to the instrument at the summit six poles

(*Continued on page 329.*)



Pole, with Lightning Conductor, Near Base of Mountain.



Approach to the Foot of the Rocks, Up Which Line Is Carried.

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The Construction and Operation of Small Exchanges*

By Charles Russell.

THE small exchange, such as is used in towns or localities furnishing 500 subscribers or less, is a subject which at this time is occupying the minds of engineers and operators possibly more closely than exchanges of larger sizes. This is owing to the fact that in large cities, where the revenues are sufficient to guarantee large expenditures, the exchanges, as well as the construction, are planned upon a broad basis, while small exchanges require careful consideration of the smaller details, because the revenue is less in proportion to the expenditure.

In small exchanges we are required to run greater distances to reach subscribers, due to the fact that the surroundings or rural territory must be taken into account in order to give an interchange of business between the business men of the town and those with whom they do business in rural districts. The kind and class of service must be up to date and interchangeable with trunk line service to the large city exchanges, as well as between all other small exchanges in adjoining territory. These conditions require that both exchange equipment and line construction must be up to standard or the exchange of service is poor and unsatisfactory, which produces discontent on the part of the subscriber and eventually the withdrawal of his name from the Subscribers' Ledger.

The manager of a small exchange will find it impossible to continue an increase in business unless his subscribers are kept satisfied with the service given.

It will now appear that, first of all, the exchange equipment must be of such a character that it will give up to date service locally, and also work in harmony with trunk line service to the best equipment of large city exchanges, and it is self-evident that in order to do this the small exchange switchboard equipment must be of the best, and the construction of all its parts must be just as substantially undertaken as in the best of larger exchanges. Experience has proven that the lines of small exchanges built and installed without a high grade of equipment, or with a low grade of insulation resistance, soon become practically inoperative in connection with trunk lines and the larger exchanges. In many instances the inferiority of small or suburban exchanges has been the means of general dissatisfaction to all subscribers in the city exchange, because of poor service to suburban territory.

Charles Russell.

As much care should be taken in the work of installation of small exchanges as is exercised in exchanges of large cities, and special insistence should be put upon having all materials of the best quality, insulation resistance should be as high as can be secured, and all parts of the equipment should be standardized, so as to operate in connection with the parent exchanges as though they were in a part of the same exchange.

It is not intended to convey the idea that suburban exchanges must contain the same equipment as the larger ones, but it is claimed that, while the signalling and supervising can be obtained by any convenient method, the transmission conditions can and should be the same, and that, whatever apparatus is used, it must be standardized with the mother exchanges.

The exchange equipment, while a necessary part of a system, does not constitute the whole system, for it is of equal importance that the construction work, including cables, open lines and installation be looked after and accomplished with the same degree of perfection as is used with equipment, because any system is only as good as its weakest point.

Just here comes up the question of maintenance, which is the one account that eats up all the profits and gets its dessert or pie from the stockholders' pockets or allows the investor to be benefitted by his investments.

The elements are great factors to be considered in maintenance, as it is from wind, storm, sleet, or a combination of these conditions, that comes such destruction to construction work as to require large maintenance accounts.

Cables underground cost more money than open line wires, but a cable underground and properly protected will not cost nearly so much to maintain as open wires, nor is it as liable to disturbing conditions which effect transmission. So it is that the use of underground cables is to be recommended in all places where it is permissible by a comparison of expense and revenue.

If there are no high potential lines to contend with, an aerial cable for twenty-five (25) lines or more can be used to good advantage, but if there are trolley or lightning lines near the telephone route, it will be much cheaper in the long run to put all cables underground. It is also necessary to protect the cable with good lightning protectors, as well as heating coil fuses, because it has been proven and is still being demonstrated by a number of small companies that a large percentage of cable trouble is caused by lightning entering cables that have not been properly protected, or from sneak or other foreign currents that would be avoided by the use of proper heating coil fuses. Let us assume that a cable properly installed, having a high insulation resistance, will remain in the same condition until interfered with; then if we can protect it in a manner to keep it in its original condition there will be practically no maintenance on the cable excepting at the boxes.

Cable makers will furnish any interested parties sufficient information to prove that cables are seldom over-protected, but are almost always unprotected, and many times what is used as a protection is really conducive to additional troubles. The fact that cable men are continually going over cables is conclusive proof that there is something wrong, either in the installation or protection of a cable, which makes it open to attacks from conducted currents or electrolysis.

Where it is necessary to build distributing pole lines they should be constructed of a good grade of chestnut or cedar, poles to be not less than seven inch diameter at the top and not more than 35 feet long, excepting for special purposes, as the shorter the pole the less liable to storms' destruction, and a 35 feet pole is high enough for all ordinary purposes.

The writer has found that poles set not more than 110 feet apart, and fitted with good arms, have stood storm service admirably.

It has also been proven that wires of No. 10 B. & S. gauge put up on double petticoated pony insulators, on 35 feet poles with 110 feet settings, have stood all kinds of weather conditions without damage unless caught by trees or other foreign objects thrown on them by the elements.

It has also been computed that the expense of construction checked against cost of maintenance of such a line as here mentioned about reaches the point of economy, from which it is recommended that lines of this nature be accepted as standard construction for pole line distribution.

The installation of instruments is an important factor in connection with every plant, but it is not intended to cover this part of the system in this paper, so we receive no more than this mention.

The operation of any plant, be it small or great, is the all-important factor with the investors, as it is from this sheet of accounts that he sees good or evil forebodings.

The superintendent of small plants must be a general manager,

*Abstract from a paper read before members of the Pennsylvania State Independent Telephone Association at the Allentown convention.

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engineer, traffic manager, construction superintendent, and, in fact, everything in one, and it is not every man who possesses these all around qualifications, hence the fact that so many small companies get into trouble in a few years.

It would be much better for small districts to join together in the formation of an association or co-operative company, of sufficient magnitude to warrant the employment of special talent to manage the different departments. However, some small exchanges must exist and be operated alone.

It is necessary to secure help that is pleasant and congenial; those who help to build up a business instead of destroying it.

Then it is also necessary to watch the expenditures very closely to see that the revenues are not eaten up, and by all means to see that each and every subscriber has efficient and satisfactory service. The lines and instruments must be kept clear of all troubles, so that interference will not occur, for there is nothing that will create adverse criticism sooner than inefficient transmission.

Operating*

By G. F. Staite.

THE arrangement of duties and positions at a telephone switchboard may appear on its face to be a somewhat simple matter and not of very great interest.

When it is stated, however, that the ideal arrangement has not been arrived at, that a great improvement on any present known system is possible, and that the arrangement of duties and positions is one of the most important factors in the giving of a smart service, it may give some idea of the wide scope of the subject, and the interest which it really contains.

It involves an accurate knowledge of the following main points:

(1) The actual traffic. (3) Work capacity of staff.

(2) The value of the traffic. (4) Distribution of load.

Before proceeding to discuss these it will be as well to examine the broad rules laid down by the Head Office with regard to the service and the capacity of an operator. In Fig. 1 is shown the Head Office standard curve for calls answered. For some reason the disconnection after conversation is not standardized in the same way, but we can take it for granted that the same standard applies. The average time of answer according to such a curve would be 5.72 seconds.

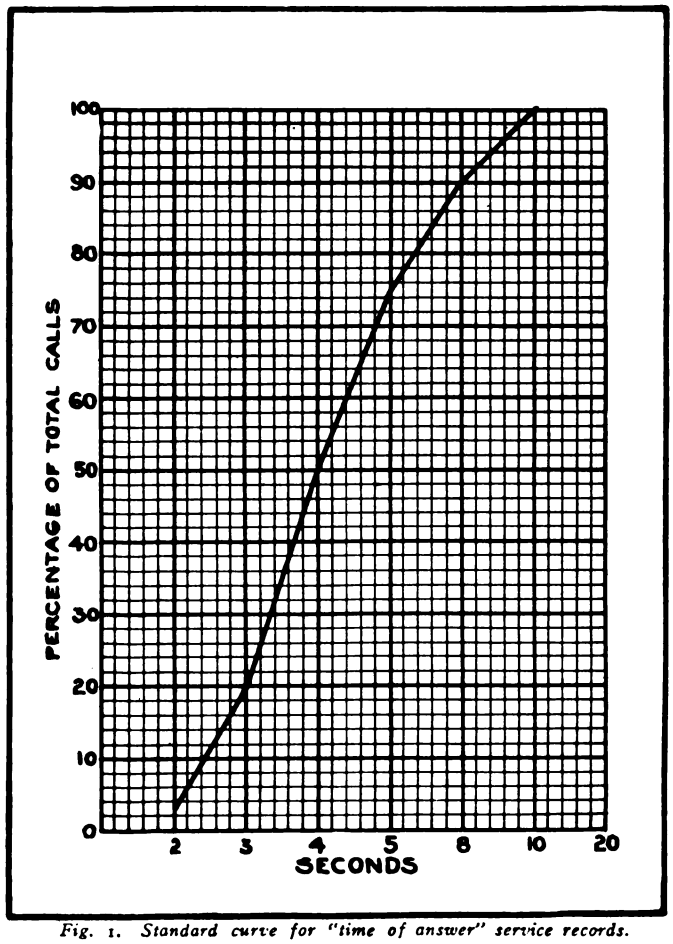

Fig. 1. Standard curve for "time of answer" service records.

The Head Office standard of capacity for operators is 100 calls per half hour, counting one trunk call as two local calls. In addition, there is allowed a certain excess to cover absence on a holiday, or owing to sickness, and to make allowance for learners, etc.

These, then, are two important objects to be kept in view: (1) To arrange the hours of duty so as to conform to the 100 calls per half-hour standard, and (2) to distribute the operators and load so that at all times each operator shall be in the best possible position to handle her own subscribers and to help her neighbors, and to keep within the attention standard.

The question as to whether these standards are correct is open to discussion. If the second be too high the first cannot be attained. For the purposes of this paper it will be assumed that they are correct.

They will now be taken up in the same order as the four main points previously mentioned.

The Actual Traffic.—This is supposed to be obtained from the usual quarterly record, prepared for statistical and other purposes, the results of which are published in book form and sent to the various districts. This record is taken on one day and is necessarily left very much in the hands of the operators. Now this does not give sufficiently accurate results for our purpose, for while it may be fairly correct in the aggregate, in detail it will be found to vary very considerably from the real facts of the case. There are many ways of getting at the truth. In Belfast, an exchange with about 40 positions, the author recorded each individual subscriber's calls for one complete day (8 a. m. till 8 p. m.) by means of two specially engaged recorders, checked by selected operators. The operators recorded in half-hours while the recorders made one continuous record for the twelve hours. The operators' records were 3.6 per cent. less than the recorders. The recorders were coached for six weeks previously to taking the actual record, and their results were taken as accurate. Such a record for Manchester would take too long, and there is a shorter method which is based on the average number of plugs in use for any stated period and the average duration of the subscriber's calls. Now to get the latter figure accurately would require some thousands of stop-watch observations, and this again would take too much time, so the author has fallen back on a double record expedient. First of all a count was taken of the plugs in use on each position every five minutes during one day by independent recorders, and from these an average figure representing the number of cords in use for each hour for each position was obtained. It doesn't really matter at present what value in calls this represents, so long as it gives a comparative value for each position (Fig. 2). You will see by the figure that the values range from 2.9 to 10.6 in the hours 10 to 11 a. m Only a few positions are shown on the figure—a busy group and a fairly quiet group—but each containing the highest and lowest value for the exchange respectively.

The next step was to get an actual value for these comparative values, so as to show which positions were too heavily loaded and which were too lightly loaded. This was done by taking eight positions and recording each subscriber's line by a special recorder (the operators keeping a peg count in half hours), and a plug count being taken at the same time each five minutes as before. In this way there was obtained a sample of the exchange whose actual call value is known and whose plug value is also known. A curve (Fig. 3) which will gave a call value for any particular plug value can now be drawn. In recording the

*Abstract from a paper read before the Manchester (England) Telephone Society, Session 1905-6.

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"samples" the operators' peg record is only used for checking purposes. No comparison takes place between the various counters. This is most important. Having found a call value, one can now set up a second scale in Fig. 2 (Scale "B"), and immediately get the call value for each position in the exchange.

These results do not come out quite regular, but by tabulating

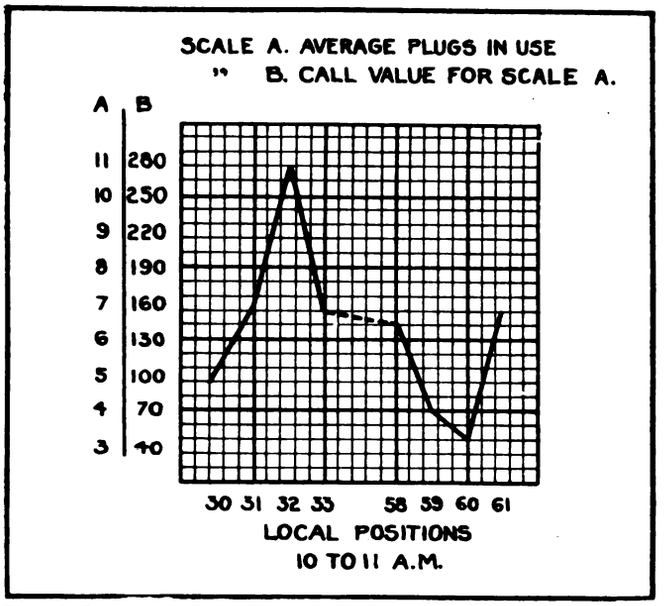

Fig. 2. Compiled from figures showing numbers of plugs in use at different positions.

all the results the correct figures will be approximately arrived at. It will be seen later, when discussing the distribution, that with good team working a variation of, say, 10 per cent to 15 per cent in individual positions does not matter. In the present case 64 position hours were tabulated, and the general figures approximated to the curve shown on Fig. 3.

It is now possible to apply the scale "B" (Fig. 2) to the whole exchange, and so get a fairly accurate knowledge of the daily load.

The Value of the Load depends upon the time required to make connection from one subscriber to another. The Head Office valuation, before referred to, is not any real help. They allow one call for any local connection and two for any trunk connection. This is over value for some exchanges and under value for others.

If it be allowed that the call from an unlimited rate subscriber to any subscriber who can be called from the multiple without bringing into use any special apparatus is the call which takes the least labor and time, that call may be taken as a standard and can be represented by unity.

TABLE I.

		Manchester (ring through).			Belfast (self-restoring indicator).			Central Battery Exchange.		
		Service.	Value.	% of total calls.	Service.	Value.	% of total calls.	Service.	Value.	% of total calls.
Destination of call		Flat, party lines, outgoing trunk to Post Office	1	99	Flat, message rate..	1	86	Flat, message rate, party lines, Post Office	1	88
		Message rate	2	1	Party line	2	10			
					Outgoing trunk to Post Office	3	4	Outgoing trunk.....	2	12
Origin of call.	Value of 100 calls—									
	From flat rate.....	.....		101	....		118	.....		112
	From party rate.....	All commuted rate.....		101	Message rate		206	Metered or commuted ..		112
	From message rate..	Record and auto box....		202	Record and auto box....		236	Metered.....		112

Table 1. Showing effect of type of switchboard equipment and class of service.

From the standard comparisons can be made to determine the value of every other sort of call which passes through the exchange. The valuation of the load depends then on purely local circumstances.

To make this clear there has been prepared a table showing the different circumstances which affect the values at Manchester, Belfast and a central battery exchange (see Table 1). The information concerning the central battery exchange is second hand, so the author cannot vouch for its accuracy, but it will serve as a good illustration of the point under consideration.

On the face of it this would appear to show that 100 calls on a common battery board are of greater value than on Manchester board. The explanation of this seeming anomaly is in the design. Each of these three exchanges is valued on its own standard, but the three standards would be of very different values, that of Manchester probably being the highest.

Telephone Business Building

By L. A. Parrish, Special Correspondent.

BEST methods of advertising, how best to get people to begin to take service, and other kindred subjects are among the paramount things for discussion in a telephone journal and in district and general conventions. It is only by comparing notes and relating experiences that the science of doing any kind of business may be reduced to anything like rule.

Believing the readers of The American Telephone Journal wuold be interested in the experience of one who has achieved practical success in various original forms of this work, the correspondent of the Journal sought an interview with Gansey R. Johnson, general manager of the Columbus (Ohio) Citizens' Telephone Company. Mr. Johnson by his original devices has done much to build up the excellent Independent system in the capital of Ohio to a list of nearly 10,000 well-satisfied subscribers. Every issue of the directory, every public occasion, every notable event is scanned both before and after its occurrence for something that can be utilized to attract the attention of the public to the Citizens' Telephone. State fairs, conventions, public gatherings of interest, all are drafted into his plans to bring helpful publicity to the great plant.

"The subject of advertising the telephone business is a large one and has considerable fascination for me," said Mr. Johnson to the Journal representative. "I think it would be much appreciated if the Journal would allow managers to exchange experiences and record their novel methods so that their success or failure might be noted. Such a series of discussions would be invaluable to telephone managers and solicitors. As it is there has been but little published on this score, while there has been an immense amount of detail printed regarding the technical side of the business.

"Now, in reference to the matter of publicity," said Mr. Johnson, "you may be interested in some of the matter we have printed on the backs of our quarterly bills. For instance, on the April bills of this year appeared the following:

Are you losing calls because your line is busy? Have you lines enough? Citizens' telephone bills may be cleared through any bank in Columbus by giving notice to the bank and to the telephone company. As the bills are regular in time and amount, this is a convenience to the subscriber, with no element of uncertainty.

In July we called the telephone bills into service again as advertisers and they did well. The following appeared:

Columbus has the largest toll board in the Independent telephone field. Franklin County business alone employs six operators; other long distance business, thirty-seven operators. Nearly

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sixty thousand messages a month are now handled from, to and through Columbus, a gain of 36 per cent. over the number possible to handle with the old equipment. More than two hundred and fifty thousand telephones are reached in Ohio alone. To Franklin County points radiate twenty-one toll lines with twenty-two additional branches. A network of Independent lines covers Ohio almost as thoroughly. One movement of the automatic dial puts a signal before a long distance operator.

"On the October bills the following appears:

Are your telephones convenient at the office, to the desks; at the store, in all departments; at the factory, throughout the plant; at the residence, upstairs and down?

Mr. Johnson explained that it costs practically nothing to print on the backs of bills any information that it may be desirable to convey to subscribers, particularly with reference to by-products or business methods.

"Some time in the future I will probably place on the bills a notice as follows:

Among Columbus retail department stores having private branch exchanges and welcoming orders or inquiries by telephone are:

6141 The Beall-Livingston Dry Goods Company.

8255* The D. C. Beggs Company.

8135* The Bowland, Moorehouse and Marlens Company, etc.

For known customers these stores are pleased to deliver samples of merchandise for inspection and choice. The list of other stores that will do the same would make a large directory in itself.

"Now I noticed in a recent Dayton directory this notice, which is a good sample of the sort of matter that is likely to attract the attention of subscribers, if presented in the directory or on the backs of bills:

The more you use the Independent telephone system the more rapid will be its growth, and the more rapid its growth the more value it will have for you without increased cost.

"Here is another thing that might interest the readers of THE AMERICAN TELEPHONE JOURNAL," said Mr. Johnson. "It is a card we give our solicitors to distribute just prior to our issuing a new directory. The cards read:

Is your name in the book? A new directory is in preparation by the Columbus Citizens' Telephone Company. Many persons—members of firms, agents, etc.—who are asked for by telephone do not have their names listed. A few calls lost may mean many times the cost of listing, which is six dollars a year. This includes business classification. Subscriptions for a main line telephone includes the insertion of one name and classification only. Names for the new directory should be in before September 10th to insure entry. Help others to find you.

"Still another feature of interest is our method of encouraging the clearing of regular rental bills through banks. We furnish our collectors with postal cards of two kinds reading respectively:

NOTICE TO BANK.

(1.) Bank. Columbus, O., ..., 190

Until otherwise instructed you are hereby authorized to pay and charge to my account the rental bills of the Columbus Telephone Company against me. .....

(2.) Columbus, O., ..., 190

The Columbus Telephone Company:

I have authorized the ..... Bank to pay your bills on presentation. .....

"We also have our telephone numbers inserted in the city directory with the names of our patrons. This is a good and convenient method of calling attention to our system."

Mr. Johnson would like to hear through the JOURNAL of the methods of getting business used by other managers and promises to give the benefit of his experiments and experiences from time to time in return.

Measuring Resistance with a Voltmeter

BY J. E. MARTIN.

IT is often most convenient for a wire chief to be able to measure the resistance of his lines with a voltmeter. However, a voltmeter alone would take too high an external resistance to give a noticeable deflection of the needle; for instance, if the voltmeter has a 40-volt scale and an internal resistance of 100,000 ohms, then through an external resistance of 100,000 ohms the needle would read 20 volts. It is obvious that any resistance between 1 and 100,000 ohms would give the needle a deflection of from 20 to 40 volts. Also 100 ohms would only deflect the needle 39.6 volts, that is any resistance between 1 and 100 would have a range on the scale from 39.6 to 40 volts.

As a wire chief, ordinarily, has only to measure from 100 to 2,000 ohms it is desirable to arrange the voltmeter so as to give a maximum deflection for this range. This can be done by putting a shunt across the voltmeter, so that only a certain per cent of the current will pass through it. If a shunt were put across the voltmeter described above it would have to be of sufficient resistance to enable the volunteer to receive only $\frac{1}{100}$ of the original current. Thus, if with the shunt there is a deflection of 20 volts, the unknown resistance would be 1,000 ohms, according to the equation:

$$\frac{100{,}000 \times (40-20)}{20} = 100x$$

$$x = 1{,}000 \text{ ohms}$$

and 100 ohms would give a deflection of 36.3 volts.

For the sake of convenience it is better to calibrate a scale on the voltmeter that will give a direct reading in ohms. To do this one should use the equation:

$$D^1 = \frac{DR}{mx + R}$$

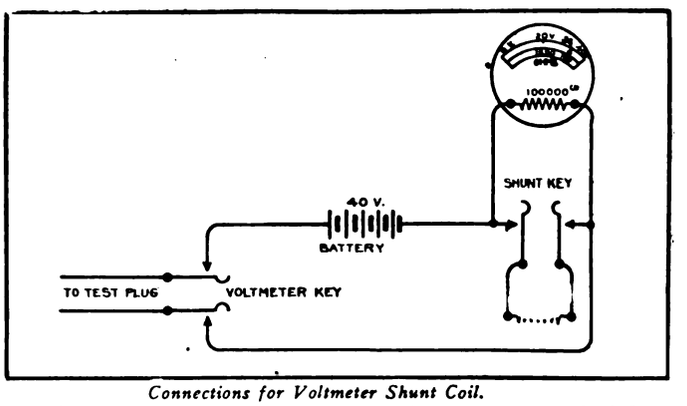
Where D^1 is the scale reading, D the full scale of the voltmeter, R the resistance of the voltmeter, M the multiplying power of the shunt and x the unknown resistance.

Thus, if
$D = 40$ volts
$R = 100{,}000$ ohms
$M = 100$
$X = 500$ ohms

then

$$D^1 = \frac{40 \times 100{,}000}{500 \times 100 + 100{,}000} = \frac{400}{15} = 26.6 \text{ volts}$$

so at a point on the voltmeter showing 26.6 volts one can mark



Connections for Voltmeter Shunt Coil.

500 ohms. After the scale has been calibrated and marked from 100 ohms to 1,500 ohms it is only necessary to glance at the position of the needle on the scale to know the unknown resistance.

If the resistance of the voltmeter is low it may be necessary to put only a 10-multiplier shunt across it and, if the voltmeter is of very low resistance, no shunt at all is necessary.

This arrangement is very accurate between certain ranges, and will give most satisfactory results.

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QUERIES

JOINT USE OF POLES.—(792.)

In our town a local light company is figuring on putting in a lighting plant and the power is to be furnished by a water mill about 2½ miles in the country. They wish to arrange with us to use our poles, which run by the plant, to bring in their wires and also to possibly use our poles over town. Can this be done without interfering with the telephone service? If this can be done, what would you consider a fair price per cross arm by the year for a lease of twenty years? The plant will not be run in the day time. Please give me your opinion in regard to this. T. H. B.

There would appear to be no objection to the arrangement which you propose of allowing the electric light company to use your poles, provided you install suitable protective apparatus at your central office and sub-stations and provided the electric light or power wires are not allowed to hang within four feet of the telephone wires. This should be increased to eight feet wherever possible.

A fair price for this service is twenty-five cents (25c.) a hitch per year; that is, 25 cents per year for each insulator or each contact of an electric light wire with a telephone pole or fixture.

If the current transmitted is to be alternating it will be necessary to transpose the telephone circuits parallel to the power lines to prevent induction.

The two wires composing each telephone circuit will have to be interchanged as to position at intervals along the line. The length of these intervals or the frequency of transposition depends on the voltage of the power circuit and the separation. It will have to be found by trial.

Grounded circuits cannot be worked on the same pole line with an alternating power circuit.

SLIDE WIRE FOR TESTING CONDENSERS.—(793.)

Will you please explain just how to lay out the slide wire part of the condenser testing outfit described in the article published in your issue of Sept. 29th? R. B. AND OTHERS.

For the benefit of the persons requesting directions for making up tests for condenser measurement, as outlined in the article entitled "Condenser Testing," published in THE AMERICAN TELEPHONE JOURNAL September 29th, it is suggested that the slide wire, shown in Figs. 2 and 3 of the article mentioned, be made up in the following manner:

A No. 30 German silver wire three or four feet in length

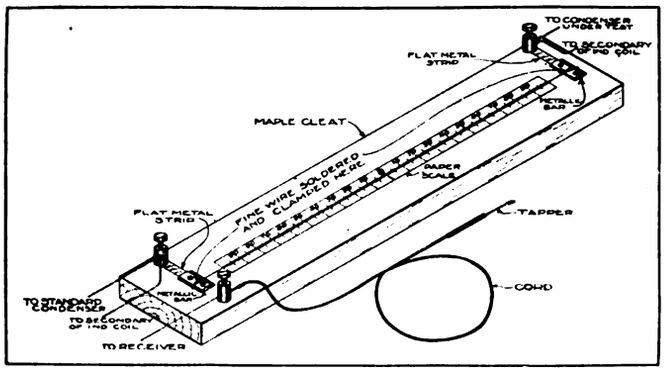

Fig. 793-a.

should be stretched tightly along a piece of hard maple wood and clamped at each end. The distance between the terminals or clamps may be made one meter, which will allow an easy method of division into decimal parts by means of a metric scale, or the wire may be made forty inches long and the decimal divisions made in inches. For convenient reading, the zero point should be marked at the centre of the scale, and reading should be made from the centre to right and from centre to left, reading both ways from zero up. Then, if the scale were divided into 100 parts on each side of the zero mark, and the silent point fall upon 20 to the right of the zero mark, the ratio arm would be 100 plus 20 to 100 minus 20, or the ratio would be 120 to 80. This would mean that the condenser being tested had a capacity of 1½ micro-farad, if the standard was one micro-farad.

If the instrument is to be used to any extent, it is well to plot

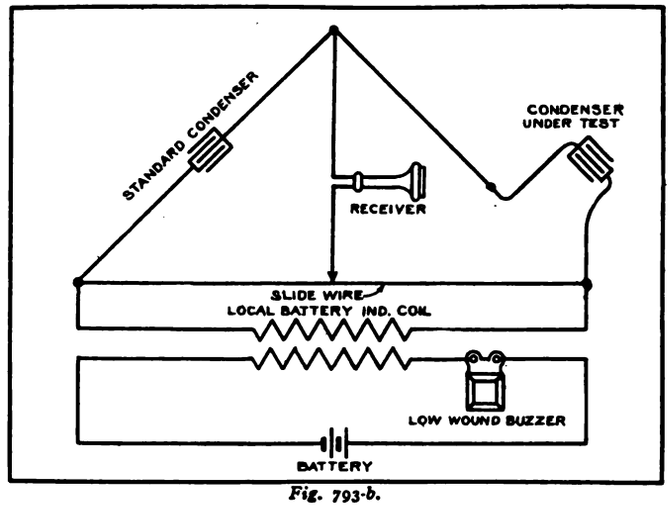

Fig. 793-b.

out directly on the scale a reading of micro-farads in place of ratios. For instance, in the case referred to above, we find that the point 20 to the right should be marked directly upon the scale 1½ micro-farads. The scale readings would then run from one micro-farad at the centre of the wire to a zero capacity at the left end of the wire, and an infinite capacity at the right end of the wire. By plotting six or eight points and marking them directly on the scale direct readings can be made of all commercial condensers. The accompanying drawings, Figs. 793-*a* and 793-*b*, show the mounting of the slide wire, and for the sake of completeness, the circuit in which it is used.

EFFICIENCY OF REPEATING COIL.—(794.)

Will you please explain what relationship exists between the two methods of expressing the efficiency of a repeating coil as described in the reply to query No. 791? In other words, to what per cent. does an efficiency of 1 mile of cable correspond? R. J.

In connection with the methods, explained in our last issue, of measuring the efficiency of repeating coils there is a certain relationship between the two systems which may conveniently be used in converting the efficiency from one system to the other.

In general each mile of cable added to a circuit introduces a loss of 5 per cent.; that is to say, the transmission is only 95 per cent. of that obtained before the mile of cable was added.

This relationship is true of any length of circuit regardless of its original efficiency or the absolute volume of transmission. This is easily proven by a simple application of differential calculus, which need not be introduced here.

Thus it will be seen that, if the absolute transmission over a given circuit is 1,000 in an arbitrarily assumed unit, the introduction of one mile of No. 19 (B. & S.) gauge standard cable of 0.060 micro-farads capacity per mile will reduce this transmission to 950 or 95 per cent.

The addition of a second mile of cable will still further reduce the transmission by 5 per cent. to 95 per cent. of 950 or 902.5. The addition of a third mile will still further reduce the transmission by 5 per cent. to 95 per cent. of 902.5 or 857.4. The efficiency, therefore, of a coil which shows a loss of one mile is 95 per cent., a loss of two miles is 90¼ per cent., a loss of three miles is 85¾ per cent., and so on. A sufficiently close approximation for fractions of a mile may be obtained by interpolation. Thus a loss of two and one half miles denotes an efficiency of 88 per cent.

It is easily seen that a loss of n miles denotes an efficiency of 95^n, or ninety-five raised to the nth power per cent.

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THE EDITOR'S PAGE

ADVANCED STATUS OF STREET RAILWAY TELEPHONE SYSTEMS.

STREET railway companies have been led to adopt a system of car dispatching which involves the use of the telephone at numerous points on nearly every well equipped line in the country. The reason for this has been, in nearly every case, that observing officials have seen in the use of such systems a means of effecting economies in operation. Time is saved for the men on the road, officials and operating men are relieved of the worry incident to uncertainty, and the liability to accidents, which on account of the resultant damage suits often causes the most injurious drains upon the profits of such companies, is reduced to a minimum.

It is in connection with this last advantage of the telephonic system of dispatching that the travelling public becomes most directly and strongly interested in this particular branch of street railway operation. It has long been recognized that the patrons of a transportation line are entitled to the benefits of any invention or improvement which will reduce the risk of personal injury or loss of life from accidents as soon as such inventions can be consistently applied. It is in the acquisition of knowledge of such improvements, and through lack of ability to demonstrate their necessity, that the rub has been felt in the past.

Within a few days the legislature of Vermont has been given an opportunity to put itself on record in a way which cannot fail to result in good to the many patrons of the shorter, or more poorly equipped lines which operate in the less thickly settled parts of the state, as well as to those who ride upon the longer urban lines. This has been made possible by the introduction in the legislature of an act which, if passed, will compel every person or corporation operating an electric railway in the state to install a system of telephonic (or telegraphic) communication between all turnouts in use and the chief operating office for use in operating its cars.

This act should have as a direct and immediate result the saving of an appreciable amount of time to travellers over lines of the class mentioned. The prevention of risk of injury is a benefit the value of which is not so susceptible of definite estimation, but its real existence has been sufficiently established in all places where telephone dispatching systems have been in operation. A feature of this measure which should not be overlooked is that its compulsory introduction is really a measure which will bring advantage to both parties involved, as it merely hastens the introduction of an improvement which will be as useful to the railroads themselves as to those who use them. Incidentally it gives to the telephone an official recognition which may be chronicled as one more distinct step toward its establishment in the position of a public utility of the highest order.

THE INDEPENDENT MANAGER.

THE practical difficulties which confront the stockholders of a small telephone company who are anxious to find a man capable of taking active charge of their property and conducting their business efficiently were the subject of reference by Mr. Charles Russell in his paper read at the recent convention of the Pennsylvania Independent telephone men. With sufficient brevity to give them emphasis he alluded to the various branches of acquired knowledge which must be in the grasp of such a man. It hardly seems necessary to call attention to the fact that it is because there have been found in various places men who could, in some unknown way, produce results in all of these separate lines of endeavor that the Independent companies have grown to their present size. The start was made in a small way, and the first exchanges which were built were so small that in order to make the slightest profit they had to be run entirely by one man. This individual in all the places where he achieved success must have been confronted by about the same situation and met it with the same spirit as that mentioned in an anecdote told by the admirers of the late Calvin S. Brice. In the course of his activities it became necessary for him to build a railroad. Some fretful person asked him if he knew how such a job was usually handled. The reply was "No, but I'll build the road," and built it he did, as later the telephone exchanges have been built.

The point of all this does not seem to be that the exchanges were well built according to our present high standards. Most of them were not. It is rather in the fact that the men who built them, by some remarkable power of selection, had been led into an enterprise of the magnitude and complication of which they had no conception, and that having once taken hold they had met problem after problem and at least arrived at a solution which would suffice as a foundation for the growth which was demanded of them.

Men who could do this must unavoidably have originally been endowed with a healthy and vigorous personality, and have developed their natural powers rapidly. So it has been in no small degree due to the friendly contact of the telephone manager with the people whose business he wished to obtain that the present development has come. In the state of strenuous competition which has existed the success of the Independents in many places may be traced to the general desire of the public to support a man known for his strength of character in a struggle where he alone was being opposed by many.

With growth, naturally has come specialization of work. Plans for securing the results of the most intelligent efforts in engineering, in construction, and in operation must be devised by the companies which own small exchanges. But more essential for their success than the attainment of either of these things is the preservation of the powerful personal influence which has in the past been exerted by the manager.

OPERATING COURTESIES.

THE grocery business and the supplying of telephone service seem to have little in common when the telephone man is trying to tell the grocery man why it costs more to give service from a big plant than from a little one. At last, however, someone has found and given public utterance to a certain analogy between the two. It is rather far-fetched but quaintly told, and has a point, so it is undoubtedly worth repeating. The idea is that people like to trade not only at a place where the price is right, but where there are no long waits and the goods are put up in nice packages. When this is applied to a telephone company it seems to get pretty close to the operators.

Of course everyone knows that the reason why he uses the telephone is to save time, and if when he gets through with a connection there is any excuse for thinking the company's agent, that is, the operator, has not done her best to help him he thinks he has wasted a part of his money, and is rather discontented. If the operator, however, can greet him every time he takes down the receiver with a polite and cordial request for the details of his call the chances are that a second or two will make little difference. The use of the telephone may thus be made pleasurable, as well as necessary, and the telephone company will have another friend.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

RIGHT TO MAKE EXTENSIONS UNDER EXISTING FRANCHISES.

On page 188 of the current volume of THE AMERICAN TELEPHONE JOURNAL is a reference to the Iowa law in regard to rights of telephone companies operating prior to 1897. It is suggested that a law be passed requiring such companies to obtain a franchise in order to make extensions. Does not the franchise right carry with it the right to make extensions? In other words would such a law be constitutional? Has that point not already been decided in a case in Council Bluffs in which an attempt was made to restrain the Bell company from making extensions? H. A. K.

AS we understand it, telephone companies doing business prior to 1897 can make extensions and utilize every street and alley without obtaining any further permission. This is because such companies are governed by section 1324 of the Code of 1873, as amended to apply to telephone as well as telegraph companies. This law applies to the Bell telephone companies, because they were organized prior to 1897. In 1897 a new code of laws for the State was adopted under which most of the Independent companies of Iowa are organized. According to the latter code, cities and towns have power to authorize and regulate telephone wires and poles and supports thereof by general and uniform regulation and to provide the manner in which and the places where the same shall be placed, upon, along or under streets, roads, avenues, alleys and public places. Code of Iowa, 1897, section 775. This section, and subsequent sections, would require a company to get additional permission from the municipal authorities before making any extension of its lines. There is thus a difference between the franchise rights acquired by companies organized prior to 1897 and those organized and doing business in accordance with the code of 1897. The latter companies must obtain further permission, while the former companies need not.

It is this unfair difference that it was proposed to remedy by the amendment suggested by Mr. Caster, which would require every company contemplating extensions to obtain permission from the municipality, whether organized prior to 1897 or subsequently to that year. We therefore would answer that every franchise does not carry the right to make extensions. The proposed amendment would be constitutional because it would place all companies on an equal footing. The case to which you allude did hold that the companies organized in accordance with the code of 1873 might make extensions without permission from local municipalities, but the decision does not apply to "local telephone companies" which started exchanges after the adoption of the code of 1897.

PENNSYLVANIA TELEPHONE BUILDINGS NOT SUBJECT TO CITY TAX.

UNDER the decisions which exempt real estate of public utility corporations from local taxation, Judge Wanner, at York, Pa., has ruled that the building and ground owned by the Pennsylvania Telephone Company cannot be taxed by the city of York. He decided that all of the property owned at that place and used by the company is indispensably necessary for the conduct of its business.

The opinion in part is as follows: "It sufficiently appears, from the admitted facts of the case stated, that all of the real estate of the defendant is held for proper corporate purposes, and the fact that some certain parts of it—viz.: the rear end of the lot and several rooms—have some space not in continuous use, does not affect the taxable character of the property as a whole. The growing demands of the business will in all probability require the constant use and entire occupation of this space in the future. If it was acquired with that object and in the meantime was not appropriated to any other use, it was not taxable, especially if, as admitted in the case stated, it represents a part of the capital stock on which tax is actually paid to the commonwealth. This view is sustained by the Supreme Court of Pennsylvania in the case of the Southern Electric Light and Power Company vs. Philadelphia, 191 Pa. 172."

ORDINANCE REGULATING RATES SUSTAINED.

THE Circuit Court at Louisville, Ky., has sustained an ordinance of the city of Frankfort regulating telephone rates, which was attacked by the Frankfort Telephone Company in proceedings in that court. The Judge did not write an opinion. The telephone company, in 1901, secured the adoption of an ordinance fixing telephone rates for ten years at rates then in effect in the business of that company. Some months ago the company sought to nullify the ordinance that it might increase the rate, it claiming that it could not operate with profit at the rates originally made. The case will be appealed to the Court of Appeals.

DISTANCE BETWEEN ELECTRIC LIGHT AND TELEPHONE LINES IN INDIANA.

A light, power and manufacturing company is about to construct a line for lighting purposes, paralleling our telephone lines for about five miles. The electric line is to carry about six thousand volts on bare copper wire. They are to build on our side of the road as the Bell lines occupy the other. Can you tell us what the law is regarding the distance they must clear our line so as to avoid induction, and what other protection must they give? Any information you can give will be appreciated. G. W. R.

NO specific distance by which the lines of a lighting company must clear those of a telephone company to avoid induction is provided by the law of Indiana. The subject would be covered by the general principle that the company building the second line must so erect it as not to interfere with the line already established. The general principles of law also require that guard wires should be erected if they are necessary to protect your lines from falling wires. These general principles are set forth in the cases of Northern Telep. Co. v. Iowa Telep. Co., 98 N. W. 113; Northwestern Telep. Exchange Co. v. Twin City Telep. Co., 95 N. W. 460; Chicago Telep. Co. v. Northwestern Telep. Co., 65 N. E. 329; Hudson River Telep. Co. v. Railway Co., 135 N. Y. 393, and State v. Railway Co., 87 Wis. 72.

MARYLAND PROPERTY OWNERS HOLD FEE IN HIGHWAY.

A SUIT instituted several months ago in the Circuit Court at Upper Marlboro, Md., by Charles Donaldson, of Berwynk, claiming damages from the Chesapeake and Potomac Telephone Company as the result of the erection of two poles in the street abutting his property, has just been decided for the plaintiff. Damages in the sum of $75 were awarded by the justice, from which judgment the telephone company appealed to the Circuit Court.

The point at issue was whether the street or highway belongs to the abutting lot owner, where the deed describes the property simply by lot and block without reference to boundaries, courses, distances or monuments. The court, deciding in favor of Donaldson, held that the property described in such a deed belonged to the adjacent owner, and not to the grantor, subject only to an easement in the public, and that its occupancy by the telephone company was a trespass. There is no appeal in such a case, so the decision is final.

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IN THE OPERATING FIELD

MOBILE TELEPHONE AND ELECTRIC LIGHT COMPANIES CO-OPERATE TO CLEAR CITY OF WRECKAGE.

AN interesting example of the way in which telephone and electric light companies may co-operate for the good of the public has come to us since the disastrous storm which did so much damage to the city of Mobile, Alabama, on September 27th. W. H. Bryant, vice president and general manager of the Home Telephone Company, of Mobile, modestly describes the part played by the companies as follows: "I wish to say that all of the companies sent their men out with instructions to cut all poles or wires that in any way endangered public safety, without regard as to whose wires they were. This action was taken in order that the electric lighting companies might furnish light at the earliest possible moment, and to be sure that there would be no dangerous wires in the territory that they proposed to operate in. After two days of this work each company attended to its own lines."

Although the Home Company suffered considerable damage to its old pole lines, it was saved from serious injury by the fact that it had its new exchange almost completed. Wires to the new building were almost all carried in underground cables, so that the loss to the new plant was trifling. The company turned all its forces towards the early completion of the new plant, and so it was enabled to overcome the difficulties introduced by the storm in a way which must have been very pleasing to its subscribers, who by their own losses could fully appreciate the troubles imposed upon the telephone company. In view of the fact that each of the wire operating companies was pretty much crippled, and might most truly have been considered to need every moment at its disposal for the furthering of its own interests, the general action which was taken for what seemed to be the best interests of the community was an especially generous one, and the companies which participated in it deserve the most hearty commendation.

MEETING OF INDIANA INDEPENDENTS HELD IN THE FOURTH DISTRICT.

THE members of the Fourth District of the Indiana Independent Telephone Association held their October meeting at Lafayette. Although a regular program had been prepared and was followed, the most interesting feature of the meeting was brought out when each member present spoke briefly of the progress made by his own company. All of the members of the association stated that their business was good, and that there is every prospect of continued growth. Several reported that they had recently rejected requests from the Bell company to connect its lines to their exchanges.

The officers of the Lafayette Telephone Company provided a most enjoyable entertainment for the delegates, being their host at dinner. A discussion of various points relating to the operation of telephone plants was held, as a result of which it was found to be the unanimous opinion that the most economical results could be secured by spending in the first instance sufficient money to build a substantial plant. Prof. A. B. Smith of Purdue University was present at this meeting, and gave a very interesting talk upon the advantages which come to telephone companies from the employment of young men who have been educated in technical schools. The following men were present at this meeting: Elmer Switzer, Otterbein Telephone Company; F. J. Goodwine, West Lebanon Telephone Company; J. C. Eckhart, Buck Creek Telephone Company; L. Messner, Williamsport Telephone Company; Ezra Fix, Boswell Telephone Company; H. G. Lutz, Odell Telephone Company; V. D. Cousins, Crawfordsville Home Telephone Company; F. O. Cuppy, Lafayette Telephone Company; O. P. Friberg, Lafayette Telephone Company; Levi Kratzer, Mulberry Telephone Company; A. J. Troxall, Mulberry Telephone Company; N. R. Johnson, Stockwell Telephone Company; Elmer Waters, South Raub Telephone Company; Jacob Raub, South Raub Telephone Company; A. B. Smith, Purdue University.

MISERABLE SERVICE OF THE CUMBERLAND TELEPHONE & TELEGRAPH COMPANY CONDEMNED BY THE MAYOR OF MEMPHIS.

APROPOS of the telephone service which is being furnished to the city of Memphis by the Bell telephone company, the Mayor of Memphis has sent to the general manager of that concern the following letter:

Memphis, Tenn., Oct. 27, 1906.

Mr. Leland Hume, General Manager,
Cumberland Telephone & Telegraph Company,
Nashville, Tenn.

DEAR SIR:

The Cotton Exchange of this city has taken action and forwarded me a copy thereof, protesting against the miserable service your company is now, and for a long time past, has given the citizens of Memphis.

Numerous private citizens have lodged complaints with me, and to my personal knowledge the service could scarcely be much worse than it is.

If immediate action is not taken I will be compelled to instruct the city attorney to take the most drastic steps possible to relieve the people of Memphis.

Your service, I might add, is not to be compared to that of the Memphis Telephone Company.

Yours very respectfully, JAMES H. MALONE, Mayor.

It is said that various business interests in the city have become thoroughly disgusted with the failure of the Bell company to give proper service. The Memphis *News-Scimitar*, in an editorial commenting on the Mayor's letter, states: "The service is bad. It is wretched. It is an imposition upon the public. It makes bad men curse and good ones excuse them."

Similar faults in the service of the same Bell company have been made the subject of official inquiry in other cities in its territory. Memphis is fortunate in having a well-equipped Independent exchange, capable of supplying good service. The other cities should profit by its example.

MEETING OF THE FIFTH DISTRICT OF THE INDIANA INDEPENDENT TELEPHONE ASSOCIATION.

THE October meeting of the members of the Fifth District of the Indiana Independent Telephone Association was held at Marion. Interesting addresses were given, in accordance with the program which had been prepared, as follows:

The Outlook—A. C. Lindemuth, president, Richmond.

County Organization—J. A. Browne, fifth vice president, Winchester.

Common Battery vs. Magneto Systems—L. A. Frazee, eighth vice president, Connersville.

The South Bend Experiment—Theodore Thorward, first vice president, South Bend.

The State Organization—Chas. S. Norton, secretary-treasurer, Indianapolis.

A. C. Lindemuth, president of the association, called attention to the fact that while the Bell engineers are speaking regretfully of the small allowances made by their company for construction, which do not permit them to do as good work as they are capable of doing, the standard for Independent construction is continually being raised. He also mentioned the gradually increasing demand which is being felt in local circles for Independent telephone securities, and the undoubted willingness which is being shown by cities where the worth of Independent systems has been demonstrated to grant better rates whenever it is necessary to enable the Independent companies to continue in business. Theodore Thorward, president of the Home Telephone Company,

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South Bend, Ind., spoke upon what he called the South Bend Experiment, where both antomatic and manual systems are operated in conjunction. The members present at the meeting were as follows: A. C. Lindemuth, Richmond; Dr. R. F. Blount, Wabash; Dr. John E. Yarling, Peru; J. A. Browne, Winchester; Theodore Thorward, South Bend; W. H. Harmon, Muncie; W. O. Taylor, Andrews; L. N. Hoggatt, Sweetser; E. A. Tull, Lapel; O. L. Barger, Converse; H. O. Miller, Fairmount; G. W. Kendall, Wabash; A. J. Rosseau, Chicago; O. L. Fisher, Chicago; J. A. Russell, Chicago; Charles Fisher, Chicago.

PROMPT ELECTION SERVICE OF INDEPENDENT COMPANY AT TOLEDO.

THE telephone system of the Toledo Home Telephone Company, of Toledo, O., was an important factor on election night in disseminating the returns as fast as they were received. The company had special connection with the Board of Elections, and also had a special Western Union wire run into the terminal room. Mrs. L. H. Hatch, wife of the wire chief, early in the evening stationed herself by the tickers, and, as fast as the news came in, she served it hot by taking the reports on a typewriter, then having carbon copies made and then distributing the reports throughout the evening to a half-score of special operators, who were especially placed to give the news to inquiring patrons of the system. The service was extremely satisfactory and highly pleasing to the very large number of subscribers who benefited by it.

TELEPHONE MEN OF NORTHEASTERN IOWA MEET AT MASON CITY.

MEMBERS of the Northeastern Iowa Independent Telephone Association came together in the Charles Hotel to participate in its regular semi-annual meeting held at Mason City on Oct. 30. About fifty members were present. The business meeting dealt mainly with routine questions. The matter of competition with the Bell lines was one of the themes of discussion. The reports of the increase of the patronage and the extension of the lines made the session a full one. A. J. Averill, of Cedar Rapids, the president of the association, was unable to be present but was represented by the secretary, S. S. Lichty, of Vinton. George T. Hewes, manager of the Independent Telephone Clearing House at Des Moines; J. H. Shoemaker, of Waterloo; A. T. Whittle, of Waverly, and other prominent men contributed to the value of the meeting.

TELEPHONE STUDENTS AT PURDUE DISCUSS PRACTICAL WORK.

THE telephone section of the Purdue branch A. I. E. E. met Oct. 30, 1906, to discuss summer experiences. Nearly all of the telephone students spend their vacations doing practical work in the field, and the gathering was termed an "experience meeting." Mr. O. C. Warner, the chairman, opened the evening by telling of his work at Terre Haute, Ind., for the Stromberg-Carlson Telephone Mfg. Co. He described many features of the routine work of installation and showed how the exchange building is arranged.

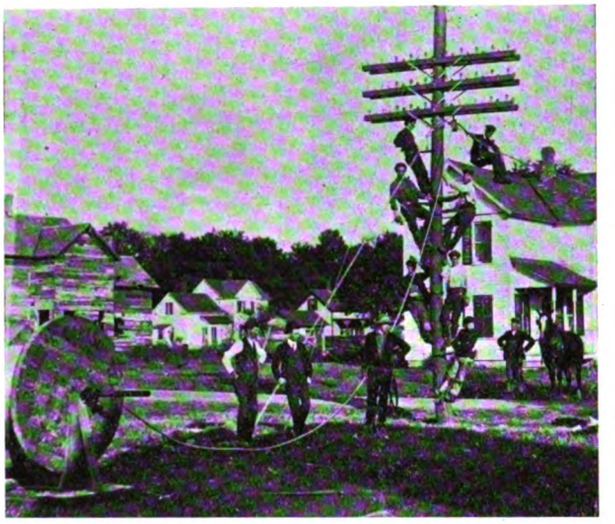
Mr. W. P. Elstun had spent the summer with the Dean Electric Co., at the factory in Elyria, Ohio. He described the harmonic converter, having worked in the department where it is made. Mr. Edgar Gent gave a very interesting account of his experiences in Cincinnati with the Bell Company. At one time he had the task of transposing some lines to free them from induction from a series arc line that ran parallel for three spans and only three feet away. He found that even a twisted pair was too noisy for service. He had also some work in cutting a new cable into service on lines already working through another cable and open wires. The case was complicated by the presence of party lines. His lesson derived from this work was the rule to work all the cuts and changes out on paper before doing any work on the wires. In this way a man can figure it all out beforehand, provide for all the subscribers, and give the linemen exact instructions as to what connections to make, with the certainty that it will all come out right. Mr. C. R. Moore then told of his work in a telegraph office, showing how troubles are tested, defective lines "patched" with sections of good lines, and the regular methods of handling messages.

As a whole the meeting was full of interest, the men taking part in a free and easy manner. It is the object to keep these meetings free from formality and make them a place for the valuable exchange of ideas.

CONSTRUCTION WORK AT CAMDEN, NEW YORK.

IN the accompanying illustration is shown an interesting feature of construction work, and an especially pleasing manner of grouping the employees whose pictures are being taken. The photograph was taken during the progress of work upon the plant of the Camden Home Telephone Company, Camden, N. Y. The men are stringing a 50-pair cable.

This plant was installed in January, 1906, and was laid out to have a capacity of 400 subscribers. The success of the company is shown by the fact that it now has more than 420 people



Stringing a 50-Pair Aerial Cable at Camden, N. Y.

connected with the lines and the company has had to string additional cable, and add more equipment to its switchboard. It has also built over 100 miles of toll lines, and has 16 toll stations and 50 miles of rural lines. To these latter are connected 150 farmers, who are much pleased with the service given by the Home company. The rates offered are $12 and $15 for residence and business service, $15 being also charged for rural line service. The company is connected with neighboring Independent companies, and averages about 65 toll calls per day. The officers of the company are as follows: L. P. Haviland, president; B. D. Stone, vice-president; Burton Osborne, manager and secretary; M. S. Powell, treasurer.

HOME TELEPHONE COMPANY OF MAYFIELD, KY., PREPARING FOR EXTENDED SERVICE.

A FEW days ago the Home Telephone Company, of Mayfield, Ky., established connections with the Clark's River Telephone Company, of West Plains. This combination increases the number of subscribers connected to the Mayfield exchange, and puts it in a position to offer a more extended long distance service.

The Mayfield Company now has long distance lines to Paducah, Hopkinsville and Louisville, which give it communication with the very large number of Independent subscribers who may be reached from these large centres. It also has connections with the Planters' Telephone Company, which exchanges business for Calloway and Marshall counties, as well as the Lilly line covering the south end of Graves County, and Fancy Farm, Lowes, Dublin, Folsomdale, Hickory Grove, Viola and Boaz. The company will soon be in a position to connect its subscribers to the most important cities of the South and West upon the completion of contemplated new toll lines.

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An Empire State Independent Exchange

By H. R. Robertson.

OVER the entire State of New York the Independent exchanges are meeting with such success as to cause them to attract and hold the attention of operators in even the sections of the country where the movement was originated and first gathered power. Typical of this growth and likewise of the strength and success which accompanies the increase in size is the Livingston County Telephone Company, of Dansville, N. Y. This company was started on its career only after the fighting through several months of the hardest battle between corporate interests and individual rights that the village of Dansville had ever seen, one which would have attracted the keen interest of every citizen in even a large city. A franchise was finally granted on April 12, 1905, by the board of trustees of the village, but only on condition that the company would have an exchange in operation within sixty days, taking care of at least one hundred genuine subscribers. With the energy that should characterize the Americans who engage in the business of supplying Independent telephone service those in charge of the new company quickly got to work and the one hundred telephones were soon connected. To get them in on time it was found necessary to use temporarily a little twelve drop magneto board, of which three drops out of the twelve drops were connected to toll lines leading to other towns.

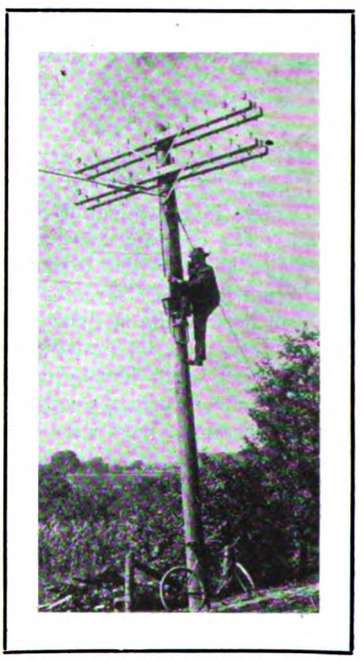
J. M. Brogan, Manager.

It was demonstrated in a very short time that this new company was in the field to stay, and then came the telling work of making itself secure by arranging to give nothing but the most perfect service to its patrons. It was now that the basis had to be strongly and surely laid as a foundation for future prosperity and this was, fortunately, recognized by those in control of the newly formed organization.

At first an old wooden building, previously used as a wagon shop, was all sufficient for the purposes of construction headquarters, storeroom, workshop and exchange, combined. It was here in a miniature room, partitioned off in a corner of this old wagon shop, that the Livingston County Telephone Company had its first exchange. It was soon apparent to the management, however, that steps must be quickly taken to meet the ever increasing demands for Independent service and so the work of setting up a new switchboard, installing underground and aerial cables, and the setting of additional poles in the village streets was considered.

The poles on the highways leading to the surrounding farms had been erected very soon after the granting of the franchise, as ninety-one of the hundred subscribers required were found in the outlying districts, the remaining nine being located in Dansville proper.

From the old wagon shop the company moved its exchange to a fine building, which was formerly a business block but was entirely remodelled to especially conform to the needs of a modern common battery telephone system. It takes up half of the second floor of this large building, which is known as the Telephone Building, owing to the telephone interests centering at that point.



Junction of Aerial Cable and Open Wire.

Lines were cut over from the old place of business to the new central office on December 30, 1905. This time was made an occasion of note for everyone in town. The day was given over to inspection by the citizens, accompanied by most enjoyable festivities. The board of directors had issued invitations to the village and town boards of Dansville and to many prominent men of Livingston County as well as to the officials of the Inter-Ocean Telephone & Telegraph Company of Buffalo. During the afternoon an elaborate dinner was served to the invited guests at Dansville's finest hotel.

Line Terminal Layout in the Exchange of the Livingston County Telephone Company.

The offices of the company are fitted up in neatly finished natural oak, the floors and woodwork throughout matching the attractive new multiple switchboard.

A portion of the central office equipment, which is of a standard type furnished by the Century Telephone Construction Company of Buffalo, as are also the substation sets, is shown in the accompanying illustration.

Through its connection with the Inter-Ocean Telephone & Telegraph Company the Livingston County Telephone Company is able to reach over seventy-five thousand people resident in the western section of New York and adjacent

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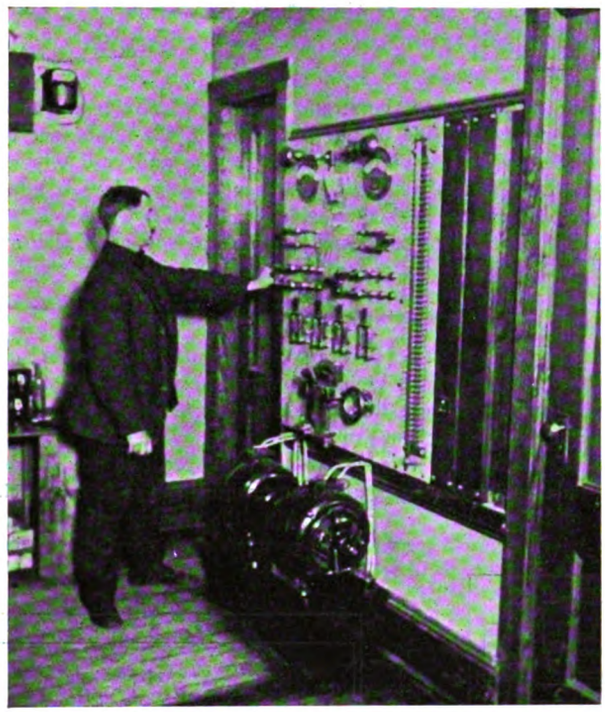
territory. This is an item which has been of no mean importance in contributing to its rapid development and one which the company appreciates to the fullest extent.

The growth of this exchange from the time of its installation at the new centre has been all that could be desired. The four



Power Switchboard and Charging Machines in the Independent Exchange at Dansville, N. Y.

hundred mark was reached by May 15th, 1906; just a small fraction of a year since it started to do business; and the fifth hundred has already been started and is well under way. It will be agreed that this is not so bad for a place of three thousand six hundred population.

Besides this exchange at Dansville the Livingston Company operates exchanges at Geneseo, Mount Morris, Avon, Honeoye Falls, Livonia, Lima, Moscow and Caledonia, N. Y., and all are in a prosperous condition and daily increasing their subscribers' lists.

A MOUNTAIN TELEPHONE LINE IN MASSACHUSETTS.

(*Continued from page* 318.)

were set in the space between the top of the pipe and the house. These are about 20 feet high and 10 inches in diameter at the butt. They are of native spruce, cut from the woods near the top of the mountain. Heavy poles were chosen in order that when securely braced their weight may help to hold them in place against the force of the strong winds which frequently blow against them. To set them it was necessary to drill and blast out holes in solid rock to a depth of 3 feet. The end poles were guyed to bolts set in drillings and held by lead. Along this line of poles a No. 6 iron wire runs from the house to the pipe line, being fastened to the top of each pole, and thus helping to support them. This No. 6 wire serves as a ground connection for the sub-station protectors. No good ground was obtainable by burying a coil near the house, on account of the rocks. It was therefore necessary to ground the protectors on the pipe. The entire work of building this line occupied a crew of eight men for about eleven days.

The protection feature for such a line is a point about which there might be more or less difference of opinion, and on account of the very severe thunder storms to which the line is exposed an unusual amount of trouble might be expected. It appears, however, that ordinary sub-station protectors, with the frequent ground poles, were quite sufficient to protect both the instruments and the central office at the lower end of the line from any damage, although several severe thunder showers have passed over the line since it was built in the early part of the summer.

FIVE THOUSAND SUBSCRIBERS ADDED TO INDEPENDENT EXCHANGES OF OHIO DISTRICT NO. 2 IN PAST YEAR.

At the meeting of members of District No. 2 of the Ohio Independent Telephone Association held at McKinley on Oct. 31 Secretary J. W. Miller, of Alliance, read his statistical report for the past year, showing a growth of 4,623 telephones in the district since the corresponding meeting last year. The district comprises Mahoning, Portage, Summit, Stark, Carroll, Jefferson, Harrison, Columbiana and Tuscarawas counties. There are thirty-two Independent companies operating in the district and representatives from nearly all of them were in attendance. There were about fifty telephone men present at the morning session, including managers, directors, stockholders and others interested in the Independent telephone lines. J. S. Brailey, Jr., of Toledo, president of the Toledo Home Telephone Company, the United States Long Distance Telephone Company, and also of the Federal Telephone Company, gave an address on the successful advance made during the past fourteen years by Independent companies, in competing with the Bell system. At the afternoon session Frank L. Beam, of Columbus, president of the state association, addressed the meeting. J. F. Souers, of Massillon, a director of the Stark Telephone Company, talked on long distance connections, and C. Y. McVey, of Cleveland, general manager of the United States Long Distance Company, spoke on extensions of long distance lines planned by the company. Following the addresses a general discussion on matters of common interest to Independent lines took place.

Among the prominent men at the meeting were W. F. Laubach, of Akron, vice-president of the district; A. S. Hillhouse, of Cleveland, manager of exchanges of the United States Telephone Company; M. C. Sammons, manager of the Massillon Telephone Company; George King, manager of the Independent company at Youngstown; J. K. Johnston, of New Philadelphia; Manager Beatty, of Ravenna; Manager Richardson, of East Liverpool; Manager Stratton, of Winona; Manager Wurtman, of Paris; Manager Taylor, of Minerva; Manager Stackhouse, of North Georgetown; Superintendent W. P. Behl, of the Stark Telephone Company; Dr. Bowers and Mr. Richards, of Uniontown; Manager Raley, of Salem; Mr. Slingluff, of Canal Dover, and Manager Briggs, of Beach City.

Among the prominent manufacturing men present at the meeting were: George B. Pratt, of the North Electric Company, Cleveland, O.; J. H. McFarland, of the Indiana Steel and Wire Company, Muncie, Ind.; John C. Henderson, of the American Electric Telephone Company, Chicago, Ill.; and J. W. Brooks, of the John A. Roeblings Sons Company, Trenton, N. J.

NEW DIRECTORY SHOWS CONTINUANCE OF HEALTHY GROWTH BY INDEPENDENT COMPANY AT TOLEDO.

Thirteen thousand five hundred copies of the latest issue of the subscribers' directory of the Toledo Home Telephone Company, of Toledo, Ohio, have been printed. The directory contains about 1,000 more subscribers than the one issued ten months ago. The book contains 300 pages, about 30 pages more than the old one. The company expects to issue a new directory every six months from now on. A lot of new underground work, cables and telephones are being put in at present, permission having recently been secured from the city council to open up four blocks of pavement to construct a new line of conduits. The company is making a specialty of installing private branch exchanges and intercommunicating service. During October the company completed nine new private branch exchanges and has closed contracts for installing four more.

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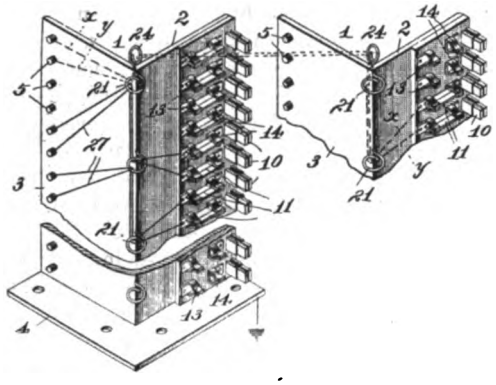
TELEPHONE PATENTS

DISTRIBUTING BOARD.

Charles E. White, Chicago, Ill., patents (No. 835,268; dated November 6, 1906; filed March 24, 1906; serial No. 307,778), a distributing board.

In Fig. 1 are shown portions of two distributing boards, as

Fig. 1.

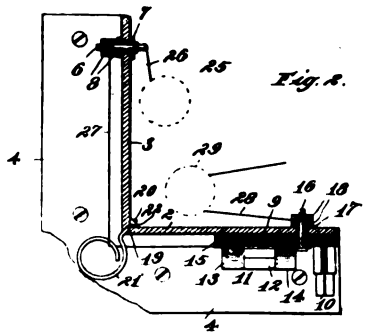


described in the specification, and the method of transferring lines from one to the other.

Fig. 2 is a horizontal section of a portion of one board. The framework of the distributing board consists of a piece of angle-iron having two flanges, 2-3 and also base flanges 4, for fastening it to the floor. From the terminals 5, carrying line wires 26, which may be formed up into a cable, 25, jumpers, 27, are run through guide rings, 21, to the pairs of fuses, 11, and lightning arresters, 10. The protective apparatus is mounted on an insulating base 9, is fastened to the screws 16, passing through insulating bushings in the flange 2, serve to fasten the strip 9, and as terminals for switchboard wires 28.

It is claimed as an advantage of this construction that all points

Fig. 2.



where cable or jumper wires are soldered or otherwise secured, are in plain sight and easily accessible. Rings 24 provide for the transfer of lines from one board to another.

TELEPHONE SYSTEM.

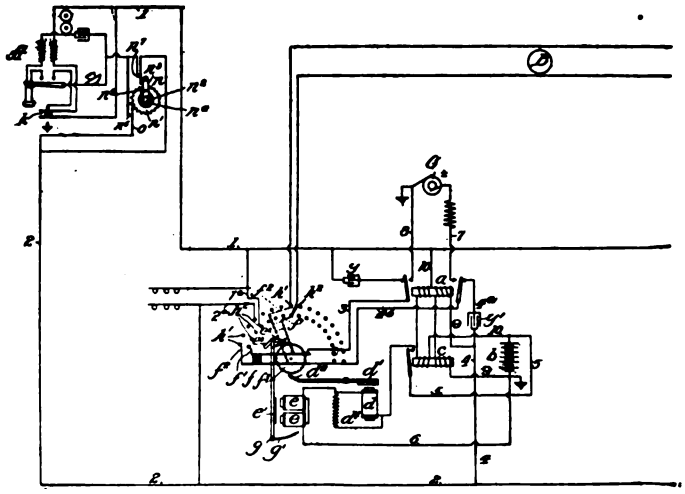
William W. Dean, Chicago, Ill., patents (No. 830,575; dated September 11, 1906; filed December 6, 1901; serial No. 84,371), and assigns to Kellogg Switchboard and Supply Company, Chicago, Ill., a telephone system.

It is the object of the inventor to dispense with all cut-off relays in connection with a subscribers' line. In series with one limb of the line he provides an impedance coal, a polarized line relay being connected to the other side. Polarized supervisory relays are included in the strand of the cord circuit adapted for connection to the side of the line carrying the impedance coils. A divided battery with connections to line and cord circuits is provided. The control of line and supervisory relays is effected through the proportioning of resistance in line and cord circuits, and the polarization of relays, in such a way as to cause the proper actuation of the apparatus during the successive steps of a connection.

TELEPHONE EXCHANGE.

Claude D. Enochs, La Crosse, Wis., patents (No. 828,101; dated August 7, 1906; filed October 16, 1905; serial No. 282,986) and assigns to the Western Electric Company, Chicago, Ill., an automatic telephone exchange.

In the circuits for this system are employed two double-wound non-polarized relays, one, *c*, for controlling the selecting mechanism, and the other, *a*, for controlling the ringing current. The line wires 1 and 2 terminate in contacts f^1 f^2, carried by selector



arm *f*. Each line has a pair of terminals h^1 h^2 on each selector, with which the movable contacts of the selector arm may make connection. The rotating arm *f* may be advanced by stepping magnet *e*, and held in its advanced position by retaining magnet *d*; these magnets being connected in local circuit 5 6, which is controlled by selecting relay *c*, which in turn is controlled by switching mechanism at the subscriber's station. The ringing relay *a* is differentially wound, and the selective relay *c* cumulatively wound, so that when the metallic circuit is closed the relay *a* is not operated, while the relay *c* is actuated to close local circuit 5 6, including battery *b*, stepping magnet *e* and retaining magnet *d*. The retaining magnet *d* is arranged to act sluggishly in releasing by means of a non-inductive shunt d^4, while the stepping magnet is adapted to respond quickly to a cessation of current. Since these two magnets are in series in the local circuit 5 6, pulsating current will cause armature d^1 to be continuously attracted, while the armature c^1 will be vibrated. The result is a step by step advance of the ratchet wheel which carries the selector arm. The interrupted current is furnished by alternately making and breaking the circuit at the subscriber's station. After the selection of the desired line, to ring the bell the circuit is completed from ground at the calling station, through line 1, conductor 10, and through relays *a* and *c* and battery *b* to ground. Since this circuit includes only one winding of differential relay *a* it, as well as relay *c*, is energized. The relay *a* by closing its

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POSITION WANTED—As Assistant Manager or Superintendent of telephone exchange of two to eight hundred subscribers. Six years' experience, good habits and can give best of reference. Address Box 717, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York 717

WANTED—Position in Mexico as Superintendent, by man aged 28. Have executive ability and technical education. Seven years' experience in construction, maintenance and switchboard installation. Best of references furnished. Address Box 723, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 723

AT LIBERTY—A1 telephone man, long experience at line, instrument, switchboard and trouble. Permanent position with Independent telephone company, not less than 300 telephones. East or South preferred. State size, equipment, etc., first letter. Address S. B. Fay, Fort Smith, Arkansas. 725

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AN expert on storage batteries, switchboard cables and heavy construction, with fourteen years' experience with Independent companies, now traveling for one of the largest Independent operating companies in the United States, wants a position as manager. Cannot consider less than $1,200 a year. Address Box 722, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 722

WANTED—Well educated young man, good appearance and references with some telephone experience. Write fully. Address Box 727, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 727

WANTED—A telephone salesman. Must be a business getter and a hustler; a man who can command trade and is worth a good salary. Address Box 724, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 724

WANTED—Position as manager of an Independent exchange. Ten years' experience in different departments. Address Warren F. Jaques, Park Rapids, Minn. 726

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front contacts connects brushes f^1 f^2 to ringing generator *G;* and the current then passes to contacts h^1 h^2 of the called subscriber's line and thence to the bell at the sub-station.

TELEPHONE TRANSMITTER ARM.

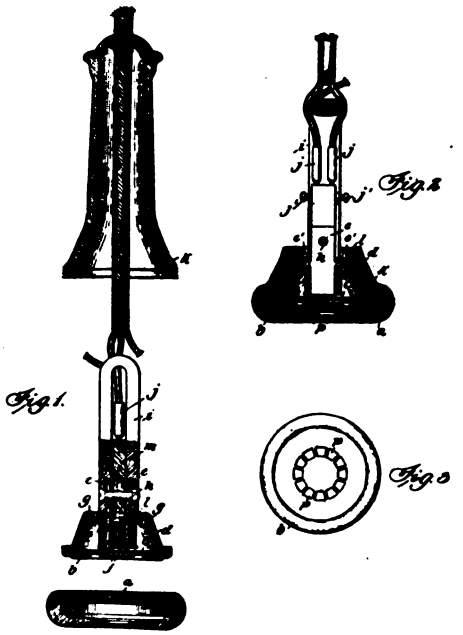
John A. Loff, Chicago, Ill., patents (No. 833,745; dated October 23, 1906; filed December 6, 1901; serial No. 84,876) and assigns to the Kellogg Switchboard & Supply Company, Chicago, Ill., a telephone transmitter arm.

This invention covers a form of hollow transmitter arm, made of sheet metal, and manufactured by the various processes of stamping, drawing and forming. Descriptions are given of the pivots and the means for fastening the transmitter, and the form of construction which permits the passing of conducting cords from the transmitter through the center of the arm.

TELEPHONE RECEIVER.

Charles T. Mason, Sumter, South Carolina, patents (No. 835,361; dated November 6, 1906; filed March 7, 1906; serial No. 304,674), a telephone receiver.

As will be seen by referring to the figures, the magnet structure, the diaphragm, its supporting cup, and the magnets are all entirely independent of the enclosing case. Figs. 1 and 2 are



longitudinal sections taken at right angles. Fig. 3 is a view of the metallic cap which holds the diaphragm in place. The pole pieces *e* are firmly fastened to a disk *l*, which rests on the bottom of the cup *d* through an aperture in the bottom of which the pole pieces are inserted. The screws *g* serve to clamp the pole pieces and likewise the coils *f* in position. The bolt *h* fastens the pole pieces to the permanent magnet *i* and also to the fibre block *m*, which supports the cord terminals *j*, fastened by screws j^1. The cap *b* shown in Fig. 3, which clamps the diaphragm in position, has, in a preferred type, a ring of holes *p*, the diameter of which ring may be greater than that of the opening in the ear piece *a*. These make it impossible for anyone to injure the diaphragm when the receiver is assembled. When the receiver is assembled the cap *b* fits within the rabbet in the ear piece *a*, and the cup *d* fits within the front end of the casing *k*, the rim of the cup being against the end of the casing, and the parts are all clamped together by the engagement of the threaded ear piece and casing.

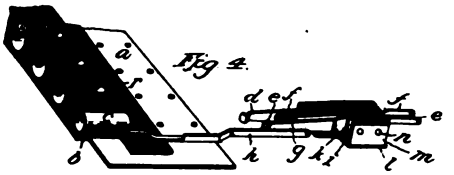
INTERRUPTER FOR AUTOMATIC TELEPHONE SWITCHES.

Alexander E. Keith, Chicago, Ill., patents (No. 831,875; dated September 25, 1906; filed February 17, 1905; serial No. 246,126) and assigns to the Automatic Electric Company, Chicago, Ill., an interrupter for automatic telephone switches.

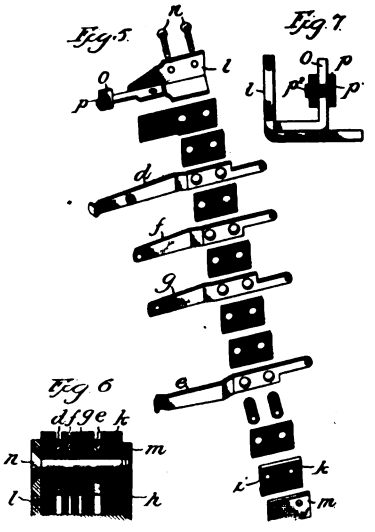
In this patent is described an interrupting device to be inserted in the energizing circuit of the rotary magnets of an automatic telephone exchange, to provide means whereby the armature of the rotary may be alternately released and attracted, causing the rotation of wipers until an idle trunk is reached. Methods of making and connecting the necessary apparatus, and other related improvements in automatic systems are described. This invention makes its possible for each trunk selecting switch to have its own interrupter, thus doing away with the more or less complicated common interrupter machine which was formerly provided for all of the trunk selecting switches in an exchange.

SPRING JACK FOR TELEPHONE SWITCHBOARDS.

Howard B. Holman, Park Ridge, and Edward B. Craft, Chicago, Ill., patent (No. 833,390; dated October 16, 1906; filed June 24, 1905; serial No. 266,740) and assign to the Western Electric Company, Chicago, Ill., a spring jack for telephone switchboards.



This invention particularly applies to cut-off jacks. The springs of the several jacks are intended to be mounted up in units which may be readily removed from the bank to which they belong. The strip of jacks comprises a metal mounting plate *a*, insulating face strip *b*, in which test sleeves are rigidly mounted, and jack units mounted behind the holes of the test thimbles and attached to the extensions *h* from the thimbles. The unit is made up of a metal frame *l*, the corresponding clamping plate *m*, and line springs *d e*, cut-off contacts *f g*, and strips of insulating material between the respective springs, all secured together by clamping screws *n*. Fig. 5 is an isometric view, showing the several parts of a jack unit ready for assembly. Fig. 6 shows an enlarged sectional view of a unit. The projecting portion of the frame is bent up as indicated at *o*, to carry an insulating button *p*, shown in Figs. 5 and 7. Spring *e* is adapted to rest against the face of the insulating button with the desired amount of tension. The cut-off spring contact *g* is provided with an opening to fit the projecting end p^2 of the button. Since the stud or insulated piece carried on line spring *d* is normally pressed by the tension



of the spring against the cut-off contact spring *f* to cause it to close its contact with spring *g*, it is evident that all of the springs are located, and their movement is limited.

INSULATOR.

Richard A. Falkenberg and Solomon S. Simon, San Francisco, Cal., patent (No. 834,567; dated October 30, 1906; filed August 29, 1905; serial No. 276,283), an insulator.

This invention covers a form of insulator with a slotted top for the reception of wires, with the object of retaining them in position without the use of ties.

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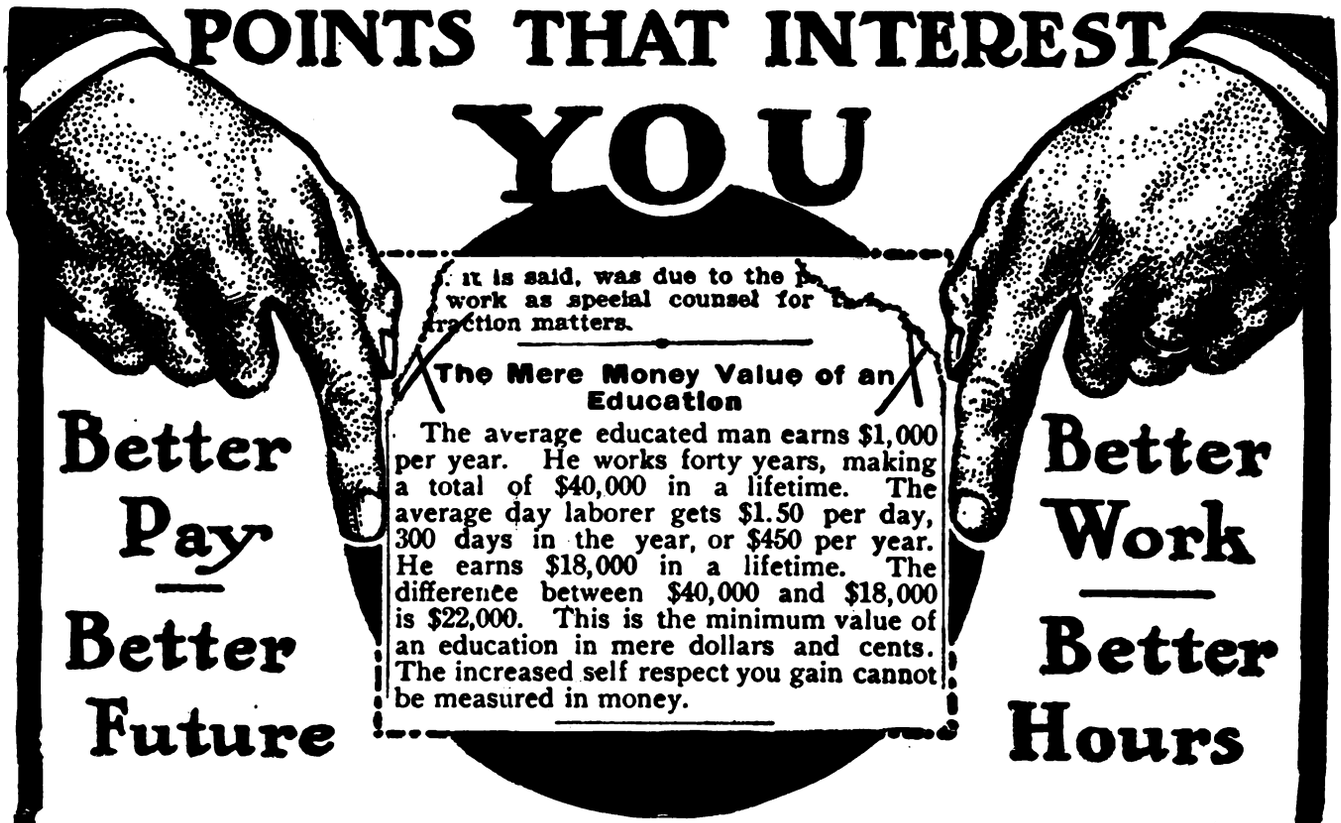
POINTS THAT INTEREST YOU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IN THE MANUFACTURING FIELD

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A NEW CIRCUIT CHANGING SWITCH.

A SMALL circuit changing switch, designed originally to meet the requirements of the U. S. Signal Service in field manœuvres, contains so many excellent features not usually found in switches of this kind that it has been adopted by the Sterling Electric Company, of Lafayette, Ind., for use on all of its equipment where a low voltage two point switch is required.

In the first place, the base is cut from a solid piece of hard rubber which affords the highest possible insulation between the terminals. The contact with the lever is made over a machine-cut stud of large size, and a strong spring, pressing down against the upper side of the lever, holds it firmly against the stud, and, by means of this knife blade clutch and stud combined, reduces contact resistance to such a small amount that it is possible to carry a current of 20 amperes without danger from overheating.

Sterling Circuit-Changing Switch.

Connection with the wires can be made with either a locknut or a soldered joint, as the ends of the stud posts are drilled to receive the end of a No. 12 wire.

The value of a switch having a low contact resistance which is at the same time neat in appearance and of convenient size, will be readily appreciated by exchange managers who have had many troubles with the old style of wooden base switches used for cutting in night bell, operator's battery, pilot lamps and generator sets.

In the army sets, which are used for both telegraph and telephone service, a thoroughly reliable switch for transferring from the buzzer telegraph to the telephone side of the set is absolutely necessary and this switch has been found to meet the severest requirements.

As a switch for ground detector or voltmeter testing it cannot be excelled, as there is no appreciable leakage across the terminals. For automatic fire alarm systems, where changes of circuit from metallic to grounded lines are frequently necessary, it is being installed in a great many places.

A NEW CEDAR COMPANY.

THE Sterling Cedar and Lumber Company, of Monroe, Mich., with a capital stock of $100,000, all paid in, has recently been organized by W. C. Sterling.

The officers of the new company are: W. C. Sterling, president; W. C. Sterling, Jr., vice-president and secretary; C. H. Slocum, Bay City, treasurer and manager; W. S. Beck, Bay City, mill and store manager.

The lands of the new company are located fifteen miles north of St. Ignace, in Mackinaw County, along Carp River and St. Martin Bay. They cover 4,000 acres of timber land and are estimated to contain over 25,000,000 feet of wood, 50,000 cedar poles, 250,000 cedar ties, 250,000 posts and 15,000 cords of pulp wood and a large amount of bark. In the purchase are also included a large saw mill, camp and outfit, stores, dock, river and lake front privileges. The location enables the firm to handle all its cedar by water, having a fine harbor in which to build rafts and a good dock from which to load vessels. The firm is planning to open a wholesale lumber yard and a small cedar yard in Monroe, as well as a cedar yard in Toledo. Shipments can be made by rail from Mackinaw City by towing the product across the Straits at Mackinaw.

W. C. Sterling and C. H. Slocum, with two expert land lookers, have gone over the tracts in person and satisfied themselves as to the quality and quantity of the timber.

The new company begins operations at once and W. C. Sterling is now at Charles, the headquarters of the enterprise, getting the mills, stores and camps in shape. Unless unfavorable weather and scarcity of labor prevent, the company expects to lumber at least 6,000,000 feet of hard wood, besides considerable cedar during the first year. It is already cutting and skidding logs, telegraph poles, ties, posts, pulp wood and shingle bolts, which are to be hauled to the mill as soon as the weather is cold enough to make ice roads.

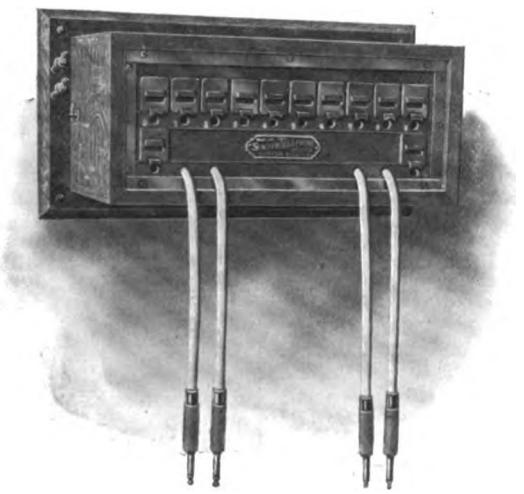
The operations of the company will be directed by W. C. Sterling, who is known as one of the most capable men in the cedar business to-day. He started in this business twenty-six years ago and his success has been remarkable. He is now at the head of several cedar firms with a capital stock of hundreds of thousands of dollars.

W. C. Sterling, Jr., has been associated with his father for fifteen years and has generally handled the offices of the various firms, besides himself directing the company's affairs during the absence of his father.

C. H. Slocum has been associated with the Sterlings for a number of years. For the past four years he has been manager of the Michigan Cedar Company, in which they hold a controlling interest, a concern that has been doing a business of several hundred thousand dollars a year. This firm is expected to be absorbed by the new company before many months have passed.

W. S. Beck has had charge of the Michigan Cedar Company's Bay City office for the past two years.

Mr. Beck and Mr. Slocum will go into the woods to supervise operations there. The new company, starting with this exceptional organization and very large tract, should be in a position to furnish high grade poles to telephone companies on a very satisfactory basis for several years.



Sumter Switchboard for Small Exchange.

THE HOLTZER-CABOT ELECTRIC COMPANY, Boston, Mass., and 395-397 Dearborn street, Chicago, Ill., in a folder recently prepared, describes the way to build a first-class telephone cheaply by assembling standard parts in a case of approved type. This paper is illustrated with excellent views of the generator, receiver, transmitter and other apparatus entering into the make-up of such an instrument, all of the equipment being manufactured in the shops of the company at Brookline.

EQUIPMENT FOR VERY SMALL EXCHANGES.

FOR operating central offices of less than twenty line capacity the Sumter Telephone Manufacturing Company, of Sumter, S. C., has recently brought out a very attractive combination of apparatus. Although the apparatus used is all of standard types with which telephone men have generally become familiar, it is in the combination of the separate pieces and the design of the wall cabinet and wiring that the principal novelty and interest in this equipment lies.

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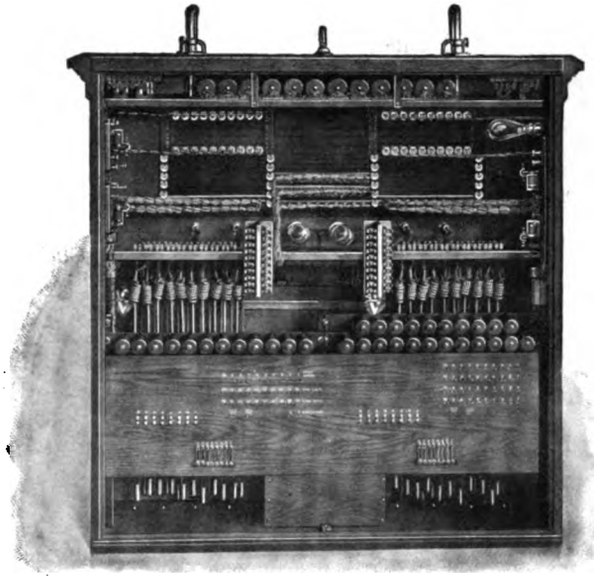
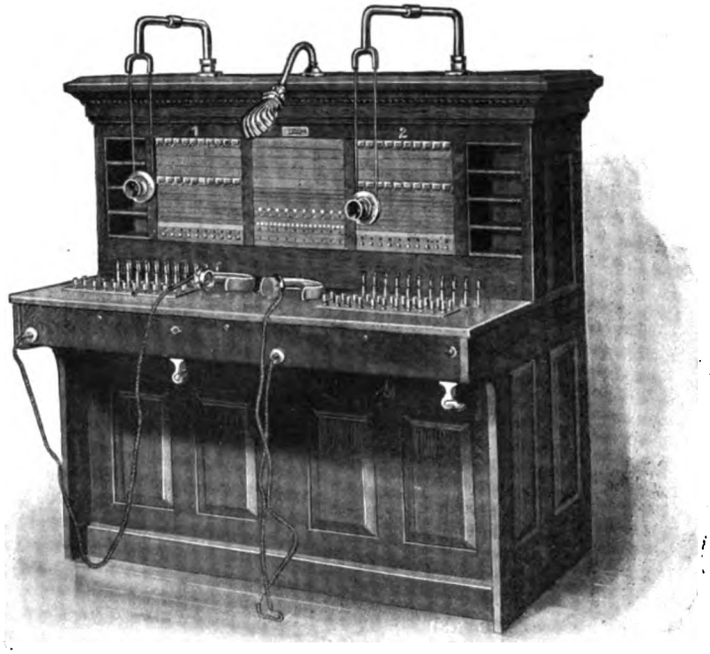
LONG DISTANCE SERVICE

IT has not been so very long ago that it was the usual thing to connect the toll lines to drops on the local switchboard and to have the subscriber's operator look after them between calls. In those days a special toll board was a novelty, generally a very crude affair, consisting often of a "wart" or bracket cabinet on the end of the local switchboard.

The almost phenomenal extension of long distance lines, the ever increasing popularity of this means of communication, and the strong competition between the Independents and the old company, has brought about a demand for a more adequate and efficient class of equipment---designed especially to handle such service.





These illustrations show a type of toll board built by us for one of the largest Long Distance companies in the Independent field---for a busy exchange and switching point. It embodies all that is best and up-to-date in toll boards. Built under specifications ---subjected to rigid inspection---and guaranteed as to quality and efficiency.

If you are in need of a modern toll board, let us have your specifications or tell us your requirements and we will draw specifications for you, subject to your approval. No charge for making specifications and estimates.

If undecided as to what you want or need, write us and we will send an engineer to talk it over.

THE NORTH ELECTRIC COMPANY

KANSAS CITY CLEVELAND DALLAS

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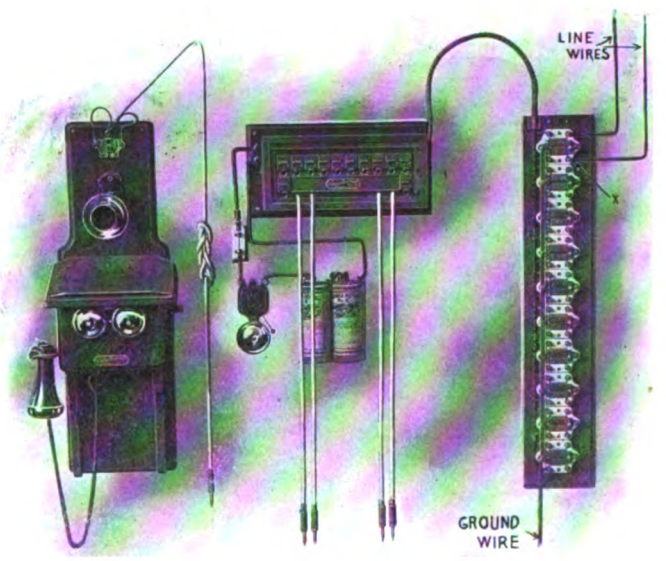
The accompanying illustrations show the appearance of a ten line switchboard cabinet adapted for mounting upon the wall, and in the second illustration the complete equipment for a ten line exchange, including not only the switchboard but the operator's telephone and protective apparatus.

In the switchboard cabinet are mounted one standard "Unitype" jack strip and ten "Unitype" drops. It will be remembered that this is the style of drop which is removable from the front of the switchboard without the use of any tools whatever. With each ten line board there are furnished two cord circuits, each equipped with a high wound clearing out drop and listening jack. The listening jack is provided in order that the operator, by placing the "operator's plug" in the listening jack, may ascertain whether the parties who have been talking have finished in case the connection is left up for a long time without the receipt of any ring-off signal. The operator's plug is connected directly to the line posts of the ordinary telephone shown at the left. This instrument serves as an operator's set, and all talking and ringing is done from it, thus eliminating keys, push buttons, etc., from the switchboard equipment. The operation of the board is carried on as follows: When the line drop falls the operator plugs into the corresponding jack with the operator's plug and communicates with the person calling. After finding out the number of the line which is desired and code ring, the operator puts the operator's plug in the jack of the party wanted and rings up his line by turning the crank on the wall telephone. When the called party answers, the operator's plug is removed and the two persons are connected by a regular pair of cords. When the parties have finished talking they are supposed to ring off in the usual manner, and when they do so the clearing out drop falls, showing that the connection may be pulled down immediately.



Complete Sumter Equipment for Exchange of 10-Line Cacapity.

The company also manufactures twenty line boards of the same design, excepting that two rows of drops and three cord circuits are furnished with them. For protection the company recommends the well-known Mason multi-discharge lightning arresters, which may be very conveniently mounted upon the wall at one side of the switchboard. The connections for lightning arresters and also for the night bell circuit with which the cabinet is provided are clearly shown in the illustration which is presented upon this page.

THE LEEDS & NORTHRUP COMPANY, 4901 Stenton avenue, Philadelphia, Pa., has issued a pamphlet which gives full directions for making tests with the apparatus which it designates as "A Cable Splicer's and Lineman's Fault Finder." This is a new instrument of simple and substantial construction which makes use of a principle that makes the process of picking out a bad wire and locating a cross or ground so simple that it is said any lineman can easily learn to do it with rapidity and accuracy. The instrument is readily portable and is self-contained. Directions for using it were prepared by Charles L. Goodrum, formerly engineer with the United States Telephone and Telegraph Company, of Philadelphia, and at present chief engineer of the American Automatic Telephone Company, of Rochester, N. Y. To those who wish to obtain a simple yet extremely accurate testing set the leaflet gives interesting information.

H. L. PARKER, who was formerly connected with the Mountain State Electric Company, of Wheeling, W. Va., has recently joined the organization of the Commercial Electrical Supply Company, of St. Louis, Mo., as manager of the telephone department.

JULIUS ANDRAE & SONS' COMPANY, Milwaukee, Wis., has just issued a very interesting little folder which is intended to show why "Wisconsin is a happy State" for the telephone man. The reasons given inside the folder are numerous enough. Almost every type of apparatus used in a telephone sub-station is described and illustrated and the reasons why the Andrae equipment has given such good satisfaction are set forth.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Rochester, N. Y., reports having closed contracts for switchboards at the following places: Palouse, Wash.; Georgetown, S. C.; Cumberland, Md.; Goldfield, Ia.; Provo, Utah; Morton, N. Y.; Parma, Idaho; North Adams, Mich.; Indianapolis, Ind.; Moultries, Ga.; Oakman, Ala.; Newtonville, Mass.; Clyde, Ohio; Logan, Utah; Rochester, N. Y.; New Castle, Ky.

THE CENTRAL TELEPHONE & ELECTRIC CO., St. Louis, Mo., is distributing its Bulletin No. 25. This shows complete apparatus for magneto and central energy systems. It contains many new ideas which will be interesting to managers of operating companies.

EMPLOYEES IN RAILWAY SHOPS AT COLUMBUS INTERESTED BY AUTOMATIC TELEPHONE.

SUPERINTENDENT ROY OWENS, of the automatic department of the Citizens' Telephone Company of Columbus, O., delivered a lecture on "The Automatic Telephone" under the auspices of the Railway Young Men's Christian Association before the hundreds of Pennsylvania shopmen in that city. The association has instituted a series of noonday lectures in the great shops, and this was one of the series.

Superintendent Owens was greatly pleased to have the opportunity to present this subject to so large a body of skilled workmen. So intense was the interest in the automatic switchboard used in the demonstration and in the lecture generally that Mr. Owens was begged by hundreds of the men to continue the demonstration that they might have a better opportunity to learn the details of the system. He therefore returned three days in the week, ending November 3, and gave a 40 minute lecture and demonstration each day for the pleasure and instruction of the men.

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PERFECT TALKING QUALITIES

Every Part Instantly Accessible
Hard Rubber Shell & Diaphragm
Completely Enclosed in Metal Case

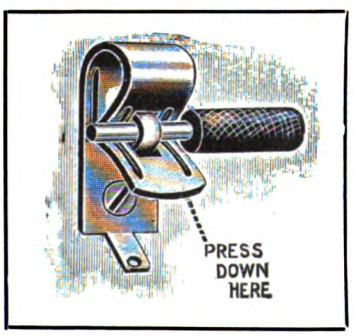
Unbreakable

The Strongest Receiver in the World

The SUMTER TELEPHONE MANUFACTURING COMPANY

Get "Forty-Eight Bulletin" **SUMTER, S. C.**

ARE YOU PREST FOR TIME IN MAKING TESTS ABOUT THE EXCHANGE—at the distributing board, for instance? ¶ Why not use The Fahnestock Spring Binding Post? The stript wire is slipt under the loop and the strong tension of the spring holds it firmly in place. ¶ You have mist half the good points of dry batteries if you have neglected to have your dealer supply them fitted with this post FREE. Specify them on your next order.



WRITE FOR CATALOG AND SAMPLE

FAHNESTOCK ELECTRIC CO.
129 Patchen Avenue Brooklyn, N. Y.

PRINTING THE TIME OF DAY ON THE TOLL TICKET WITH

The Calculagraph

Holding the ticket face downward as shown, the operator pushes the right hand lever back. The elapsed time is printed by actuating each lever once. The overtime charge is exactly determined. **SIMPLE—STRONG.**

It Makes No Clerical Errors. ***Write for Catalogue***

CALCULAGRAPH CO.
1437 Jewelers' Building New York City
Agents for Canada: Northern Electric and Manufacturing Co., Montreal.

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THE WEEK'S MESSAGES

NEW COMPANIES.

BOULDER, COLO.—The Rocky Mountain Telephone Company, of Boulder, Colo., has been incorporated with a capital stock of $10,000. The directors are T. S. Waltmeyer, R. S. Morrison and E. D. DeSoto.

STAMFORD, CONN.—The Porto Rico General Telephone Company of Stamford has filed articles of incorporation with the State Secretary. It has an authorized capital stock of $100,000. The company proposes to operate telephone and telegraph lines in the island of Porto Rico. Among the incorporators are Frederic Culver, of Hadlyme; Granville Whittlesey, of Greenwich, and Generoso Candina, of San Juan, Porto Rico.

EFFINGHAM, ILL.—Articles of incorporation have been filed by the Central Illinois Long Distance Telephone & Telegraph Company. The capital stock is placed at $2,500, and the incorporators are B. W. Kerr, C. E. Munday and T. C. Dore.

HIGHLAND, ILL.—The Farmers' & Merchants' Telephone Company, with a capital stock of $15,000, has been incorporated. The incorporators are Leo R. Brand, M. Cummings and John S. Koerner.

CRANDALL, IND.—The Mutual Telephone Company has been incorporated to construct and operate a telephone system. The directors are J. L. Walk, Jas. Crandall, Wm. Rudell and W. P. Lafaller.

NOBLESVILLE, IND.—The Noblesville & Ohio Telephone Company, Noblesville, Ind., has been incorporated, and will construct and operate a telephone system in Hamilton County. Its capital stock is placed at $800.

BURLINGTON, IA.—Articles of incorporation have been filed for the Gate Telephone Company. The capital stock is placed at $10,000, of which $2,000 has been paid in, and the officers are as follows: President, William H. Taylor; vice president, Alfred J. Dean; secretary and treasurer, Thomas Peebles. The principal place of business is to be at Burlington, and it is understood that the company is a branch of the Mississippi Valley Telephone Company, with which Mr. Peebles is connected.

FULTON, IA.—The business men of Fulton have organized an Independent telephone company to be known as the Fulton Mutual Telephone Company, and have elected the following officers: President, G. H. Thompsen; vice-president, Samuel McCullough; secretary, J. C. Snyder; treasurer, A. C. Williamson. It is the intention of the new company to connect with the Farmers' Mutual Telephone Company, which operates extensively throughout the northern part of the State, and work on the system will be commenced very soon.

LOST NATION, IA.—A new Independent telephone company is being organized at Lost Nation. Among those actively engaged in the organization is H. B. Acott.

PAOLA, KAS.—The Paola Telephone Exchange Company, of Paola, has been incorporated.

HYDEN, KY.—The Pine Mountain Telephone Company, of Hyden, has been incorporated with a capital stock of $3,500. The incorporators are W. S. Eversole, W. D. Feltner and Thomas L. Gabbard, of Hyden, and James H. Jeffries, of Pineville. It is the intention of the new company to construct a telephone system from Hyden, Leslie County, to Pineville, Ball County.

DAGGETT, MICH.—Plans are under consideration for the formation of an Independent telephone company to construct a line from Daggett to Nathan and other points on the Wisconsin and Michigan Railway.

DEER CREEK, MINN.—Articles of incorporation have been filed by the Deer Creek Telephone Company. The authorized capital stock of the company is $25,000, and the following officers have been elected: President, Harold A. Baker; vice-president and treasurer, Arthur D. Baker, secretary, John C. Smith.

LITTLE FALLS, MINN.—A farmers' telephone company has been organized to construct a line from Little Falls to Royalton.

HIGHLAND, MO.—The Farmers and Merchants' Telephone Company has filed articles of incorporation. The capital stock is placed at $15,000, and the incorporators are Leo. A. Brandt, M. Arnings and J. S. Hoerner.

SPRINGRANCH, NEB.—The Springranch Telephone Company, of Springranch, Clay Co., has been incorporated. It has a paid up capital stock of $800, and is limited to a total issue of $10,000. Among the incorporators are W. F. McReynolds, L. J. Dana, P. C. O'Brien and William Ashby.

BURLINGTON, N. J.—The Independent Telephone Company, 333 High street, Burlington, N. J., has been incorporated with a capital stock of $25,000. The incorporators are Samuel Jeffrey, Grace Jeffrey and Louis H. Williams, all of Burlington.

CASHION, OKLA.—Articles of incorporation have been filed by the Mt. Zion Rural Telephone Company, of Cashion. The capital stock is placed at $2,000, and the incorporators are D. M. Gilbreath, F. H. Smith and T. G. Abercrombie.

OLUSTEE, OKLA.—Articles of incorporation have been filed by the Olustee Telephone Company, of Olustee. The company has a capital stock of $5,000, and the incorporators are J. W. Weems, of Carmel; E. G. Walcott, T. I. Truscott, J. W. Edwards, D. W. Walden, W. T. Armstrong and T. R. Moore, of Olustee.

SHREWDER, OKLA.—The Shrewder-Metcalf Independent Telephone Company of Shrewder has been incorporated with a capital stock of $2,500. Among the incorporators are H. M. Newberry and F. D. Culpepper, of Shrewder, and Hugh Metcalf, of Metcalf.

BEND, OREGON.—The Deschutes Telephone Company has been reorganized with the following officers: W. E. Guerin, Jr., president and treasurer; E. B. King, vice-president and assistant secretary; R. D. Wickham, secretary; B. Wilkinson, auditor. It is the intention of the new company to build lines from Bend to Prineville, Ice Caves, Silver Lake, Laidlaw, Sisters, Cline Falls, Forest, Redmond and a number of other towns. A number of rural lines will also be constructed.

KLINESVILLE, PA.—An Independent telephone company has been organized at Klinesville, by A. Greenawalt, Kempton; D. P. Berk, Albany; W. Kunkel, A. D. Kunkel, Klinesville, and others. The company is building lines between Klinesville and Kempton, and expects to eventually connect with Trexler, Wanamaker, Steinsville, Jacksonville and Lynnport.

REYNOLDSVILLE, PA.—The Paradise Telephone Company, Reynoldsville, Pa., has been incorporated with a capital stock of $5,000.

PIERPOINT, S. D.—Articles of incorporation have been filed by the Pierpoint Telephone Company, of Pierpoint, Day Co. It has an authorized capital stock of $10,000.

MOAB, UTAH.—The Blue Mountain Telephone & Electric Company has been organized for the purpose of building telephone lines from Moab to Monticello and Verdure, and eventually into Bluff City and Indian Creek.

MAPLE FALLS, WASH.—An Independent Telephone Company has been formed at Maple Falls, whose intention it is to build a line between that city and Bellingham, via Deming.

WAHL, WASH.—Articles of incorporation have been filed by the Silver Lake Telephone Company, of Wahl, Whatcom county. The incorporators are George Hemni, T. B. Jones and Richard Kohler, and the capital stock is given as $2,000.

STOUGHTON, WIS.—A new Independent telephone company, to be known as the Kegonsa Independent Telephone Company, has been incorporated with a capital stock of $1,000, divided into 40 shares at $25 each. Its principal place of business will be in the township of Pleasant Springs, and its field of operations will be in Pleasant Springs, Dunkirk and Stoughton. The incorporators of the new company are Clarence Jordalen, O. P. Swerig, O. T. Hougan, L. P. Erdahl and O. T. Tiesberg.

VERMILION, ALB., CAN.—The Alberta Power, Light and Supply Company is seeking incorporation to supply electricity and to carry on a general telephone business. Particulars may be obtained from H. V. Fieldhouse.

FRANCHISES.

CHARLESTON, ILL.—The Citizens' Mutual Telephone Company has been granted a twenty year franchise by the city council of Charleston.

DALLAS, TEXAS.—A franchise has been secured for a new telephone line for some distance between Dallas and Houston by W. H. McGrath, of Dallas. It is his intention to secure the right-of-way for a long distance line through Texas in the interests of the new company which he represents.

FINANCIAL.

CHAMPAIGN, ILL.—The Home Telephone Company has increased its capital stock from $100,000 to $200,000.

HENRY, ILL.—The Spring Valley Telephone Company is to increase its capital stock from $10,000 to $15,000. This is done to provide for the extensive improvements to be made in the company's lines.

MONROVIA, IND.—The capital stock of the Monrovia Mutual Telephone Company has been increased from $2,000 to $3,000.

ST. JOSEPH, MO.—The stock of the Citizens' Telephone Company, which has recently been acquired by Theo. Gary, of Macon, and A. A. Goddard, of Topeka, is to be increased from $150,000 to $1,000,000.

CANADIAN, TEXAS.—The Stockmen's Telephone Company has increased its capital stock from $5,000 to $10,000.

EAGLE, WIS.—At a recent meeting of the Eagle Telephone Company a dividend of 3 per cent. was declared.

COMBINATIONS.

QUINCY, ILL.—All the Lewis county telephone interests are to be merged into one company which will co-operate with the Home Telephone Company, of Quincy. Present lines will be rebuilt and new branches will be added.

NEWARK, N. Y.—It is the intention of the Wayne-Monroe Telephone Company to remove its exchange from Marion to Newark, and consolidate with the exchange at that place.

BRYAN, O.—The telephone exchanges located at Williams Center, Mark Center, Farmer, Sherwood and Ney have been acquired by the

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EVERY COIL

of **Roebling Double Galvanized Telephone Wire** bears a tin tag and lead seal upon which the word "**Roebling**" is stamped.

Don't accept Wire without the **Roebling Seal.**

JOHN A. ROEBLING'S SONS CO., - TRENTON, N. J.

SUBSCRIBER'S LEASE AND TOLL LEDGERS

Write To-Day For Samples and Prices. Toll Bills. Rental Bills

Form G-90.	For Small or Branch Exchange use; carries account for 2 years.
Form G-90-A.	For Large and Medium City Exchanges and Systems of Exchanges; the most complete form made.
Form G-90-B.	For City Exchanges having many Rural Lines.
Form G-90-C.	For City Exchanges, Rentals and Toll Charges separated.
Form G-90-E.	For Small Exchanges, Rentals only.
Form G-90-F.	For Small Exchanges, Tolls only.
Form G-90-G.	One subscriber to a sheet; carries account 4 years.
Form G-90-H.	One subscriber to a sheet; carries account 12 years.
Form G-90-I.	For Small Exchanges; Bound Books; carry 12 subscribers on a page for 1 year.

THE Edwards-Hine Co.

TELEPHONE SYSTEMATIZING DEPT.
5 and 7 PEARL STREET (EAST), GRAND RAPIDS, MICH., U. S. A.

PUZZLED OVER THE BATTERY PROBLEM

We don't wonder some users of dry batteries are in a quandary. Glance through any of your trade papers and you see no less than a half dozen dry batteries advertised, and each one claims to be the best, while this, of course, could be true of but one.

Why not reason this way? The battery that has been on the market for the longest period with a constantly increasing sale is apt to be the BEST battery.

There's nineteen years' experience behind Nungesser Batteries and they are sold today in nearly every country on the globe.

That's worth considering. We'll let YOU say they're the best after you've tried them.

Stromberg-Carlson Tel. Mfg. Co.
ROCHESTER, N. Y. CHICAGO, ILL.

MICHIGAN WHITE CEDAR POLES

In addition to the several yards we have had in the past, we wish to call your attention to our new yard which is located at Escanaba, Mich.

The acquisition of this new yard enables us to ship poles by all railroads or by the lake routes, thereby enabling us to give the best delivered prices.

The location of our new yard makes it easier to secure cars, thus facilitating prompt shipment.

In many cases poles can be shipped by car-ferry, making possible a great saving in cases of shipment to Eastern points.

We are wholesalers exclusively, shipping in car lots only.

Write us for delivered prices and "Pole Booklet No. 8-A." Yours for the asking."

KELLOGG SWITCHBOARD & SUPPLY CO.
CHICAGO, ILL.

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THE WEEK'S MESSAGES

Bryan Telephone Company. A number of new toll lines will be built by the Bryan Company to take care of its increased business.

ELECTIONS.

GREENSBURG, IND.—The following officers have been elected by the Decatur County Independent Telephone Company: President, C. P. Miller; vice president, Morgan L. Miers; secretary, Thomas E. Davidson; treasurer, J. H. Christian.

IOWA CITY, IA.—The following officers and directors have been elected by the Johnson County Telephone Company: President, A. T. Averill, Cedar Rapids; vice-president, S. W. Mercer, Iowa City; secretary and treasurer, Jay Chatham, Iowa City. Directors: A. T. Averill, G. M. Averill, H. N. MacDonald, Jay Chatham and S. W. Mercer.

NEW LONDON, IA.—The Henry County Telephone Company has elected the following officers: President, W. Francy; vice-president, J. E. Peterson; secretary, A. D. Hayes; treasurer, V. H. Shields.

JOPLIN, MO.—The following officers have been elected by the Home Telephone Company: Theo. Gary, Macon, Mo., president and manager; A. F. Adams, Joplin, vice-president and assistant manager; R. W. Frey, Joplin, secretary and treasurer.

DECATUR, ALA.—The Morgan County Telephone Company contemplates connecting its lines in Madison County with another Independent company of Scottboro in Jackson County. With this connection the Independent company would have connections with all points in the extreme northeastern portion of the State. The Hon. John Proctor, of Scottboro, is conducting the negotiations.

PERSONAL.

OSCAR MITCHELL has recently been promoted to the position of superintendent of construction, with headquarters at Chattanooga, Tenn., by the Cumberland Telephone & Telegraph Company.

MISCELLANEOUS.

MALVERN, ARK.—The Clarkson Telephone Exchange at Malvern has been acquired by P. Crisby, the purchase price being $4,000.

FAYETTE, ILL.—The Fayette Telephone Company has been acquired by R. E. L. Smith, of Fayette, the consideration being $1,818.

SHELBYVILLE, IND.—The New Long Distance Telephone Company is at work on its system at Shelbyville. It has already established several pay stations and has begun steps which will doubtless lead to the granting of a regular franchise.

New Construction in the Field

OLIVE, CAL.—The Home Telephone Company is constructing a line from Anaheim to Olive. Lines will also be built from Olive to Fullerton, where an exchange will be established, Yorba, El Modena, Garden Grove, Buena Park and Orangethrope.

GAINES, FLA.—It is the intention of the East Florida Telephone Company to extend its lines as far south as Tampa and St. Petersburg, and when this work has been completed the company will construct lines towards the west.

BYRON, ILL.—A line between Stillman Valley and Lindenwood, giving direct connection with the Ogle County line, is being constructed by the Byron Telephone Company.

DE KALB, ILL.—The Selective Telephone Company is making many improvements in its system at De Kalb.

DUNCAN, ILL.—The lines of the Duncan & Havana Telephone Company are being extended to Lewistown.

HARVARD, ILL.—Two new switchboard positions are to be installed by the Harvard Telephone Company at its central office.

KANKAKEE, ILL.—The Independent Telephone Company, of Kankakee, which has completed its line to Gilman, expects to install a system in that city.

MATTOON, ILL.—It is the intention of the Mattoon Telephone Company to reconstruct its entire system at Mattoon. Decided changes and improvements will be made, and it is estimated that it will take about a year to finish this work.

PEORIA, ILL.—The lines of the Citizens' Telephone Company are being extended in East Peoria.

PIPER CITY, ILL.—The Piper City Telephone Company is building a line to Chatsworth.

OROFINO, IDAHO.—It is the intention of the Clearwater Telephone Company, of Clearwater, Idaho, to install an exchange at Orofino, and build lines into the surrounding country.

CHESTERTON, IND.—It is the intention of the Northern Indiana Telephone Company to install a new switchboard. Many other improvements to its system are also under consideration.

ELIZABETHTOWN, IND.—The entire plant of the Citizens' Telephone Company, of Columbus, is being rebuilt at Elizabethtown.

INDIANAPOLIS, IND.—The Long Distance Independent Telephone Company of Indianapolis is stringing two copper circuits from Indianapolis to Huntington via Wabash.

MISHAWAKA, IND.—The Home Telephone Company expects to spend about $30,000 in extending its system from Logansport south to the State

BELLE PLAINE, IOWA.—The Belle Plaine Telephone Company expects to string 9,000 feet of additional cable.

BELLEVUE, IA.—Lines to Old Springbrook from Bellevue are being constructed by the Bellevue Telephone Company.

EARLING, IA.—The system of the Earling Telephone Company is being extended.

FAIRBANK, IA.—It is the intention of the Home Telephone Company to rebuild its exchange at Fairbank.

IDA GROVE, IOWA.—The New State Telephone Company is constructing its system into Ida Grove.

ASHDOWN, KAS.—The lines of the Kizer Telephone Company are to be rebuilt from Ashdown to Bokahoma.

McPHERSON, KAS.—New lines are to be constructed by the McPherson Telephone Company.

PAOLA, KAS.—The Paola Telephone Company contemplates the erection of a number of new lines.

OWENSBORO, KY.—Extensive improvements are to be made in the plant and lines of the Central Home Telephone Company. It is the company's intention to rebuild a good part of its system.

SANDUSKY, O.—The lines of the Home Telephone Company are being extended in Sandusky.

PORTLAND, ORE.—Among the contemplated improvements which will be made by the Home Telephone Company at Portland, Ore., and which is estimated will cost in the neighborhood of $40,000, is the establishment of a new branch exchange in which will be installed a 500-line switchboard.

UNDERGROUND.

MEXICO CITY, MEXICO.—The Independent Telephone Company, of Mexico City, which already has its underground ducts laid to Chapultepec, Tacubaya and La Hermita, for the distribution of its lines to La Piedad, Tlalpam and Xochimilco, is engaged in laying an underground system to Tacuba.

KEOKUK, IA.—It is the intention of the Mississippi Valley Telephone Company to expend a large sum of money on its conduit work in Keokuk.

NORWALK, OHIO.—The Independent Telephone Company, of Norwalk, Ohio is to place many of its wires under ground.

MATTOON, ILL.—In the reconstruction of its system at Mattoon the Mattoon Telephone Company expects to do considerable conduit work.

LEAVENWORTH, KAS.—The Peoples Home Telephone Company contemplates placing many of its wires underground in Leavenworth.

NEW ORLEANS, LA.—An ordinance is to be introduced at New Orleans compelling telephone and telegraph companies to place their wires underground.

ST. JOSEPH, MO.—An up-to-date plant with underground cables is to be built by the new owners of the Citizens' Telephone Company.

HAZELGREEN, W. VA.—The Progressive Telephone Company, Hazelgreen, W. Va., J. W. Goff, manager, is in the market for the following supplies: Repeating coils, galvanized iron wire, weatherproof wire, cross arms, brackets, pins, regular insulators, transposition insulators, climbers, reels, cross arm braces, lag screws, carriage bolts, dry batteries, fuses, testing instruments, knife switches, bookkeeping forms.

MERKEL, TEXAS.—Many improvements and extensions to its system are contemplated by the Texas & Pacific Telephone Company.

HAMILTON, MO.—The Home Mutual Telephone Company has elected the following officers: President, J. S. Jewell; vice president, C. W. Wright; secretary, C. A. Metz; treasurer, John Whitelaw, Jr.

BURLINGTON, N. J.—The Standard Telephone Company, which is to be managed in the future by Ithaca capitalists, is to have its lines entirely rebuilt, and is to have its exchange made thoroughly modern in every particular.

SOUTH BEND, IND.—Considerable conduit work is to be done by the South Bend Home Telephone Company at South Bend.

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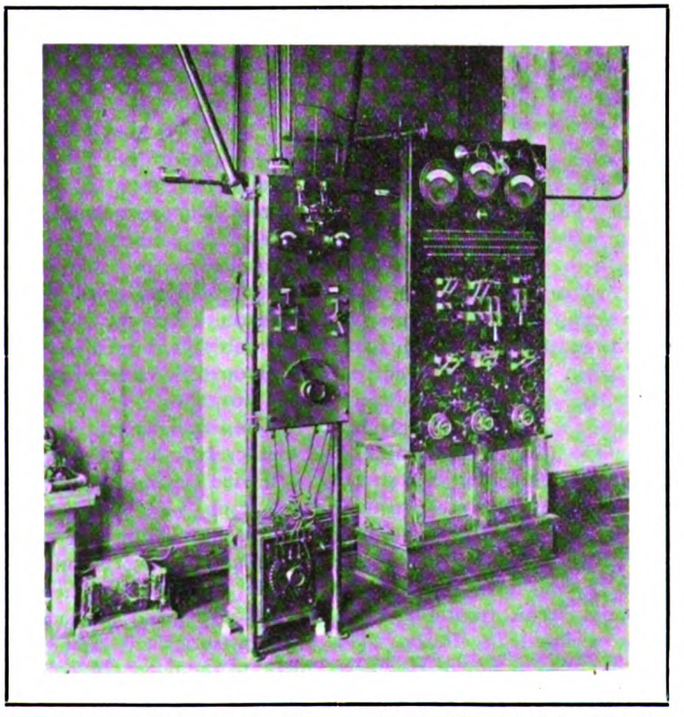
Telephone Battery Charging by Mercury Arc Rectifiers

By Samuel Ferguson.

HOW to obtain direct current for charging their storage batteries is a problem which must be solved by the engineers of all central energy telephone stations located in an alternating current territory. The methods which have been tried in telephone exchanges in various localities include the use of direct current in almost all of its known forms, such as the series D.C. arc circuit, the 500-volt trolley circuit, the 220-volt D.C. power circuit and the 110-volt D.C. lighting circuit, gas engine-dynamo set, D. C. motor generator set, A. C. motor generator set, rotary converter, electrolytic rectifier and, recently the mercury arc rectifier. It is usually essential that the batteries may be charged while in service, hence no method is permissible which will cause disturbance or humming on the telephone lines.

The requirements which must be met by the charging system are: Reliability, freedom from line disturbance, simplicity of operation, high efficiency, low first cost, low cost of maintenance, and that the apparatus used shall occupy but a small floor space.

Inasmuch as commonly the telephone batteries are low voltage, *i.e.*, about 11 to 17 cells, it is not possible to use any constant potential D.C. supply circuits to charge with, except at a very low efficiency. However, owing to the simplicity of this method, it is sometimes adopted where 110 volts D.C. is obtainable and the amount of power required is small. A better method is to employ a D.C. motor generator set, unless an A.C. circuit is available. In the past, where only A.C. power is available, the A.C. motor-generator set has been the most acceptable method of solving the problem. This method is, however, likely to be superseded in many new installations by the use of the mercury arc rectifier, recently introduced by the General Electric Company. Electrolytic rectifiers have been tried and discarded, owing to their lack of reliability, low efficiency, rapid deterioration and the disturbance on the lines and in the operators' talking sets, caused by the pulsating current which they deliver.



A Typical Installation of the Mercury Arc Rectifier Panel for Charging Storage Batteries, in the Telephone Exchange at Gloversville, N. Y.

For very large batteries, of 500-ampere capacity and over, the A.C. motor-generator is ideal, as it answers all the requirements. For the smaller batteries, giving from 10 to 50 amperes, such as are used in large numbers throughout the country, the motor-generator does not maintain the same advantage in respect to efficiency, and its first cost is high. A set capable of delivering 40 amperes at 30 volts will do well if it can show 45 per cent. efficiency, and this only at full load; while at part loads the efficiency falls off very rapidly. It is this class of installations which has been shown to be particularly benefited by the substitution of the General Electric mercury arc rectifier.

Before putting its well-known mercury arc rectifier on the market for telephone work, the General Electric Company made trial installations with several well-known telephone companies, where searching tests were made. These tests resulted in an unqualified approval of this method for charging telephone batteries. Referring to the requirements of the charging system mentioned above, the rectifier has in the first place proved itself reliable. The only part of the set which ever needs renewal is the glass tube, which will probably not fail under 1,000 hours. The replacement of a tube can be accomplished quite as easily as the renewal of a broken brush on a generator. There being no moving parts, there is no other wear or cause for any renewal of parts.

Freedom from line disturbances when the rectifier is used may be relied upon, since the noise of commutation, which can sometimes be distinguished when charging from a generator is entirely absent, and owing to the smooth wave shape of the rectified current, the noise is less than that caused by the normal gasing of the batteries.

The rectifier is extremely simple to operate, as there are no moving parts, and no attention beyond the occasional regulation of the charging current is required. The charging current will vary somewhat with any variations of line voltage. These variations will, however, hardly be noticeable with the variation of voltage ordinarily encountered on commercial circuits.

The efficiency of the rectifier depends largely upon the voltage at which it delivers the charging current and rises with every increase. Unlike the motor-generator, the first cost does not rise with increased voltage; therefore, in installations where such an arrangement is possible two or more batteries are often charged in series. At a D.C. voltage of 30 the rectifier will have an efficiency considerably higher than a motor-generator of the same K.W. capacity and will maintain this efficiency not only at full

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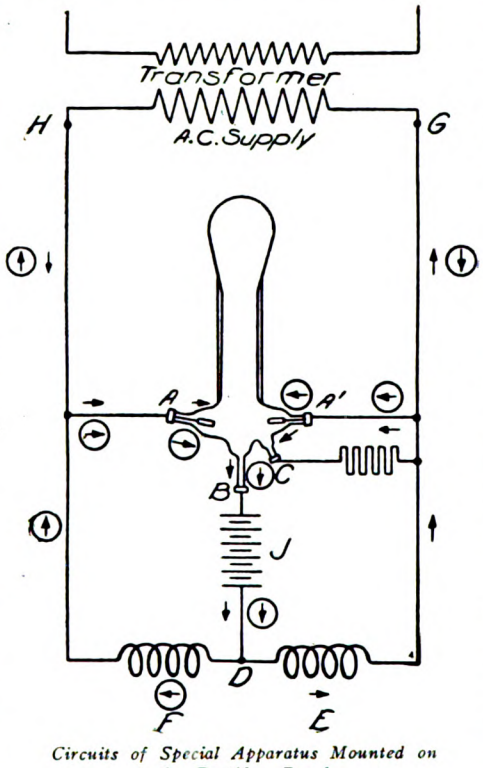
load, but at partial loads as well. The efficiency at 30 volts is about 60 per cent., regardless of the capacity of the rectifier. When operated to give current at 110 volts, the efficiency will exceed 80 per cent. This variation of efficiency, as a function of the voltage, is due to the fact that the loss in the tube is constant, regardless of the voltage, and is equivalent to a drop of about 15 volts. While this is a small percentage when the current is delivered at 100 volts or more, it is a large factor when charging low-voltage batteries.

The first cost of a rectifier of moderate capacity is approximately half that of a motor-generator set, and the cost of maintainence is very low, the only charge being the tube renewal cost.

The floor space occupied by a rectifier installation is very small, being no larger, in fact, than an ordinary switchboard panel.



Circuits of Special Apparatus Mounted on the Rectifier Panel.

The action of the rectifier is simple and easy to understand by following the circuits shown in the diagram accompanying this article. Assume an instant when the terminal *H* of the supply transformer is positive, the anode A is then positive and the arc is free to flow between *A* and *B*, being the mercury cathode. Following the directions of the arrows still further, the current passes through the load *J*, through the reactance coil *E* and back to the negative terminal *G* on the transformer. A little later, when the impressed e.m.f. falls below a value sufficient to maintain the arc against the counter e.m.f. of the arc and load, the reactance *E*, which heretofore has been charging, now discharges, the discharge current being in the same direction as formerly. This serves to maintain the arc in the rectifier until the *e.m.f.* of the supply has passed through zero, reverses and builds up to such a value as to cause A′ to have a sufficiently positive value to start an arc between it and the mercury cathode *B*. The discharge circuit of the reactance coil *E* is now through the arc *A′B*, instead of through its former circuit. Consequently the arc *A′B* is now supplied with current, partly from the transformer and partly from the reactance coil *E*. The new circuit from the transformer is indicated by the arrows enclosed in circles. The magnitude of the pulsations depends on the amount of reactance in the various circuits. For the majority of uses a 25 per cent. pulsation introduces no objectionable features, but for telephone work this amount is not permissible. Therefore, an additional reactance is inserted in the battery circuit. This reactance is charged during the maximum peaks of the rectified current and discharged during the minimum peaks, thus smoothing out all irregularities of the current delivered to the battery, which would otherwise cause disturbances in the telephone circuits.

At the foot of the page is a good illustration of the rear of the type of rectifier panel which is being largely used for telephone installations. These panels can readily be operated in multiple with one another or in multiple with any other D.C. source, as an engine-driven generator, such as is often installed as an emergency-charging set in case of failure of all other power supplies.

A further feature of this panel is the large range of D.C. voltage obtainable from a given A.C. voltage. For instance, with 110 volts supplied to the rectifier any voltage up to 45 volts is readily obtainable. If voltages between 45 and 120 are desired the panel should be operated from a 220-volt circuit. This flexibility is obtained by use of taps from the compensating reactance by means of which the A.C. voltage on the anodes may be varied at will, although the supply voltage is fixed.

The development of the rectifier has been rapid, chiefly due to its usefulness in filling an empty gap in the electrical field, and also due to the fact that it does simply, efficiently and reliably the work it is designed to do. Undoubtedly there are many uses to which it is well adapted, but to none has it shown itself to be more eminently suited than to the charging of the storage batteries in telephone exchanges.

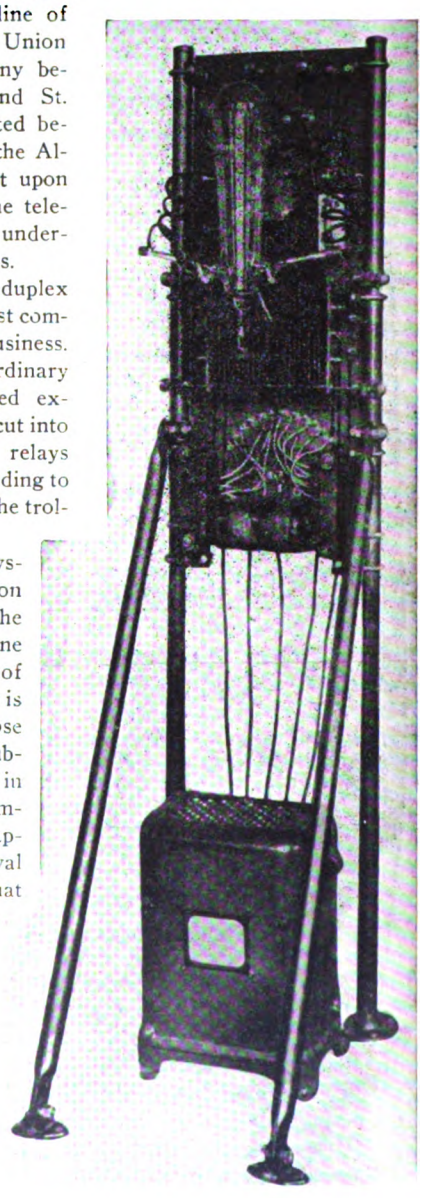
INTRODUCTION OF SINGLE PHASE ELECTRIC RAILWAYS DEVELOPS NEW PROBLEMS FOR TELEPHONE MEN.

THE heavy current single phase system of transmitting electric power, which on account of its proved efficiency is being introduced on many electric railways in Illinois and Indiana, is said to be playing havoc with service on the telephone and telegraph lines which parallel railways. The first line to use the single phase system in Illinois is the interurban company now operating cars between Pontiac and Dwight, paralleling with the Chicago & Alton steam line. The main line of the Western Union Telegraph Company between Chicago and St. Louis is constructed beside the wires of the Alton, and the effect upon the 40 wires of the telegraph company is understood to be serious.

Quadruplex and duplex systems have been almost completely put out of business. Even the wires for ordinary transmission are affected excepting where they are cut into numerous stations, the relays and batteries in each tending to overcome the effect of the trolley current.

The single phase system creates by induction a terrific buzzing upon the telegraph and telephone wires, and in the case of the latter conversation is made inaudible. Those who have given the subject attention say that in case of the telephone companies the only relief appears to be the removal of their wires to what has hitherto with other power systems been considered an inordinate distance from the disturbing wires.

Between Indianapolis and Rushville, and between Ft. Wayne and Auburn, Ind., where there are single phase trol-



Rear View of a Standard Rectifier Panel.

(*Continued on page 342.*)

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Operating*

By G. F. Staite.

THE work capacity of the operator, as before stated, is set down by the Head Office at 100 calls per half hour per operator (valued). Some few years ago it was set down as 90. Improved apparatus and possibly the tendency of operators to over record may both have had something to do with the change, the records showing that the 90 calls per half hour were frequently considerably exceeded.

The standard is supposed to represent the average capacity; but taking in the whole operating staff, from the first senior girl to the last joined half-timer, the author has not found the average to come up to this standard. Taking the two busiest half hours in the morning on the day on which the plug count was taken, the calls for the flat rate operators averaged 81 per operator per half hour, or taking the operators' own figures for the last quarterly record the average was 88. The operators dealing with these calls were 24 seniors and 47 juniors, twenty of whom had under one year's service. To get a fair average figure for all operators it is necessary to take these new operators into consideration, and if one looks for half the standard amount of work from them he is expecting probably quite as much as he will actually get. To show what this means to the rest of the staff, 50 calls per operator for these twenty operators have been deducted. This gives for the efficient staff an average of 103 calls per half hour. This is a more reasonable way of looking at it than lumping the whole staff together and fixing a standard average. Different staffs have different proportions of inefficient staff, and in some towns the class of employes is better than in others. Here again local conditions creep in.

It will now be assumed that the work capacity of the whole staff has been definitely decided, and let it be assumed that the average work capacity of the Manchester efficient operators be 100 calls per half hour, and that it is safe to work up to that figure. The problem now is to so arrange the work that under all the varying conditions of the day each operator will be in a position to receive and properly handle her proper share of work.

Distribution of Load and Arrangement of Operators.—The first step is to find the total load per half hour and plot the result on squared paper. Then, having done this, build up another curve on the same sheet, following as nearly as possible the first curve, using 100 calls as the unit in the first place and one operator

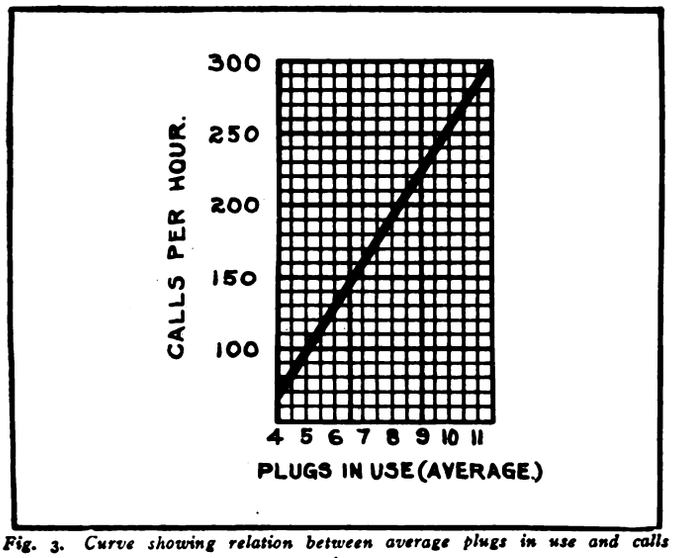

Fig. 3. Curve showing relation between average plugs in use and calls per hour.

as the unit for the second; the two curves are of somewhat different character, the calls curve, advancing or diminishing by hundredths of units in a fairly even manner, is represented by a continuous line drawn from point to point, which points represent the aggregate calls for the particular half hour in which they appear. The operator's curve, advancing or diminishing by whole

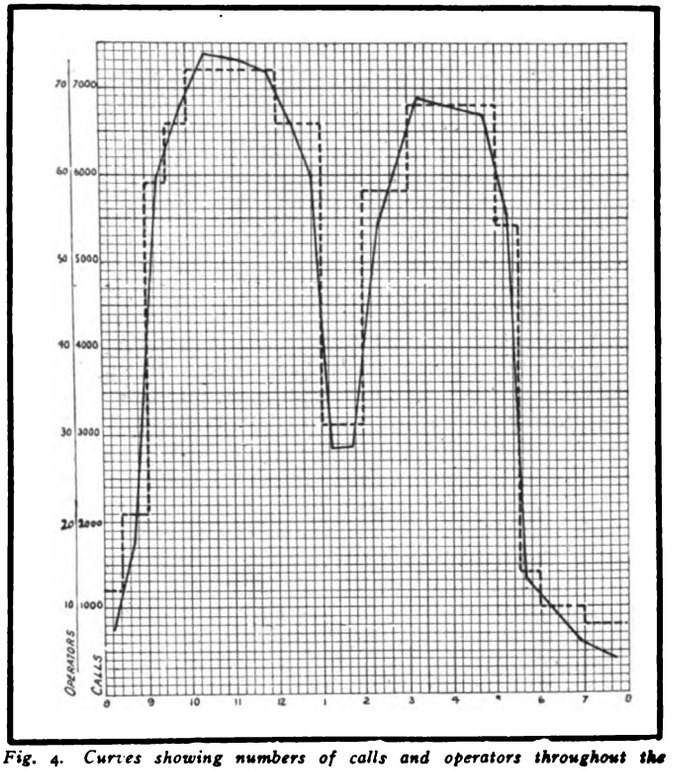

Fig. 4. Curves showing numbers of calls and operators throughout the different hours of a day.

units, is shown as a dotted line following the squares of the paper.

It has just been stated that the second curve should follow closely the first. This is theory. In practice it is not wise to follow too closely. Taking the first half hour on the curve (Fig. 4), it will be noticed that a much larger proportion of staff is on than would cover the 100 calls per operator. This is due to the difficulties under which they now work. Each operator has a number of positions to operate, she has to walk about from position to position instead of having everything at her finger ends. The adverse conditions diminish as the load increases and each operator's area gets smaller and smaller, and you will notice that by full load time it has disappeared. After the peak is passed it is not wise to commence to draw off at once, because the operators are beginning to tire and team working would be interfered with to some extent. Usually no reduction is made until twelve o'clock. From twelve o'clock to three the dinners are arranged, and at three o'clock the full afternoon staff is on duty and an effort should be made to maintain this full staff until at least 5 p. m.

From this chart is obtained the number of operator hours required and thus the number of operators. Table 2 shows a good working basis for the arrangement of the staff. The Head Office lays down the rule that all trunk, party line, and message-rate positions shall be worked by seniors, and also that one out of each group of three local positions shall be a senior.

It will be noticed that there are more operators than positions. The excess operators provide for holidays, absences for sickness, etc.

The final arrangement of the operators' times of duty and positions at the board calls for a considerable amount of ingenuity. At almost every point there are difficulties. Some of the main features are as follows:

(1) The day of eight hours should be in two equal parts of

*Abstract from a paper read before the Manchester (England) Telephone Society, Session 1905-6, continued from the issue of November 17th.

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four hours each. Anything over four hours is too long for an operator to sit at one time.

(2) Each operator must work the same number of hours.

(3) Each operator in each class must take each duty in turn.

(4) There must be a just proportion of seniors and juniors on duty at each half hour.

(5) Certain positions are the right ones to work from at very slack times, and certain positions are the right ones to leave open at less busy times.

(6) Positions should not be changed when avoidable during a spell of duty.

To discuss each of these items would take up too much time, it is well to shortly explain a system at present working, which fulfils all these conditions. First, however, there will be an attempt to show some of the general rules of procedure in filling the positions and the arrangement indicated will hold good for the busy hours of the morning and afternoon. Select certain junior positions equal in number to the difference between the morning and afternoon staff and load these to half load; let these positions be occupied in the morning by the later juniors ("B"), and in the afternoon let them be vacant, using the operators for these positions in the room which will be left vacant by other operators who work split duties, to provide for late duties. These positions should be selected with a view to spreading out the extra work as far as possible. Where there is one unbroken line make them equidistant. Manchester is a peculiar example. There are four separate lines of operators, giving eight end positions. Considering one line only, the proper place for the vacant position would be in the middle; but here it is necessary to consider the two sides of the multiple, and to have two vacant positions opposite to each other would increase the drawbacks, so they are placed a little out of the centre in each case and in opposite directions.

Next select the senior operators for the local positions, one for the centre position of each group of three. Put very good operators next to the half-load positions. Then put an efficient junior at each section, observing the same caution of selecting a very good one next to the half-load position as in the senior. This leaves one position at each section for the less efficient juniors.

Rank.	Positions.
Clerk-in-charge	
Supervisors	One for each 9 operators' positions.
Record operators	As required.
Senior operators	One for each injunction, party line and message rate position. One for each section of three positions for local subscribers.
	Reliefs for holidays and sick absence as required.
	One for each remaining local position.
Junior operators	Reliefs for holidays and sick absence as required.
Learners	About 5 per cent. or 6 per cent. of total staff.

Table 2. This shows an outline for making up an operating staff.

Having arranged these, take each group of three and weigh its merits. Some groups can be called good and some only fair; don't let the "only fair" groups be adjacent to each other.

The Belfast duty sheet fulfils all the conditions previously mentioned, viz.:

(1) No operator works more than four hours at a stretch.

(2) Each operator works 45 hours per week.

(3) Each operator in each class takes each duty in turn.

(4) Seniors and juniors having separate duty lists there is always a just proportion of both on duty.

(5) The positions changing with the duties the same positions are opened and closed automatically each day at the same time.

(6) For the same reason the minimum number of changes takes place during the spells of duty, and these are automatic, and the same changes, which are the necessary ones, take place every day.

Table 4 is a portion of the duty sheet. It will be seen by this that operator 1 does a split duty, and so is away during the afternoon. Her position being one that cannot be closed, the good junior from 6*a* takes her place from two to six. 6*a* also is a position which cannot be closed, so the less efficient junior from 6*c* takes 6*a*; 6*c*, being a half-loaded position and suitable for leaving vacant in the afternoon, is closed.

There is just one other point to be mentioned, and that is design End positions are things to be avoided on subscribers' sections; they are affected in the same way that a vacant position affects adjacent positions. This checks the speed of answer, and slow calls must be looked for and guarded against by careful distribution. It is estimated that an operator on end positions loses about 20 per cent efficiency.

In an exchange of good design there would be only two end positions, the total loss in efficiency being only 40 per cent of one operator's capacity.

Taking Manchester with 72 positions, this would only mean 5 per cent loss per position, not a serious matter. But with the present design there are eight end positions, which means 160 per cent operators' capacity loss, or 2.2 per cent per position.

DUTIES			POSITIONS		
No.	On Off	On Off	A. M.	P. M.	
1	10 — 2	6 — 10	5 B	12 B	Senior
19	9 — 1	2 — 6	6 A	5 B	Good Junior
45	9 — 1	2 — 6	6 C	6 A	Less efficient Junior.

Table 4. Showing hours on and off duty for operators of different classes.

THE TELEPHONE AS A BUSINESS MAKER.

THE comparatively small use of advertising based on the telephone in view of its advantages is the subject of an article in a recent number of *Printers' Ink*. It says that the merchant prints his telephone number on each folder, or says "telephone orders given prompt attention," but very seldom does he send out advertising matter in which telephone orders are made the main issue.

A barber in New York City has the right idea. His shop is on Broadway, in the downtown business district, where men are in a hurry. He distributes blotters through office buildings in his territory, and about the only thing on the blotter is the suggestion "make appointment by telephone and so avoid waiting." Then follows the telephone number. This convenience requires no laudation, nor does the manner of exploiting it. They speak for themselves.

Hotels in the uptown Broadway district distribute every morning about 10 o'clock a printed menu of the day's luncheon through surrounding office buildings. Business men see what there is for lunch, and are doubtless often led to a particular special dish. But this advertising would be made much more effectitve if upon the menu were printed a prominent note to the effect that tables would be reserved by telephone. It might even be practicable with guests who are known to state that steaks, chops and other dishes requiring some time to prepare would be put on the fire at any desired time by telephone order and served at the moment the guest is ready to come, thus saving what is to most people an unpleasant wait.

The grocer is a man who ought to profit by the consistent exploitation of this telephone idea. Telephones mean prosperous customers, living on a fairly liberal scale. The morning delivery service and house-to-house canvass for orders could be very materially accelerated by issuing a daily folder from which customers could order by telephone. A brief price list of vegetables, fruits and other green stuff would not be costly or inconvenient where a printing office is within reasonable distance, and the price list could be issued within two hours after the morning's stock was in and distributed to householders in the grocer's territory. Or if this were not advisable, folders could be sent out

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emphasizing the fact that housekeepers have only to take down their telephone receivers any morning to learn what is in the market.

People need to be reminded that they have telephones and shown how to use them in ordering. The telephone companies make good capital of folders that explain the uses of a telephone. Hundreds of persons would dash madly for the nearest fire-alarm box in emergency, never reflecting that the telephone is the quickest of all fire-alarms, did not the companies remind them of it in advertising. Every telephone order received puts the cost of selling on the customer, who pays for the message. What is needed is advertising matter that will make this telephone issue prominent. Readers should be impressed with the idea that the telephone is there in their own homes, and that messengers wait at the store to carry out any order they may send in. The druggist should educate his neighborhood to the speed, ease and advantages of the telephone in sending emergency calls for medicine. The physician would find this an unobjectionable form of advertising. The bank can get deposits by telephone, sending a messenger for them on request. The department store should make its daily bargains accessible by wire. Telephones are universal nowadays. They have a universal application to business. But the public is blind to many of their uses, and needs to be reminded by special telephone arguments.

Experiments in High Voltage Protection*

By Farley Osgood.

THE transmission line of the New Milford Power Company, of New Milford, Connecticut, follows the Housatonic River for about four miles, and then turns directly east and traverses for 56 miles a country which is nothing but hills and valleys, the altitude variations being about 1,200 feet. These facts are mentioned to show that, like very many other hydro-electric plants, this one is situated in an ideal position to receive the full force of all lightning storms, which, generally speaking, follow the courses of the valleys.

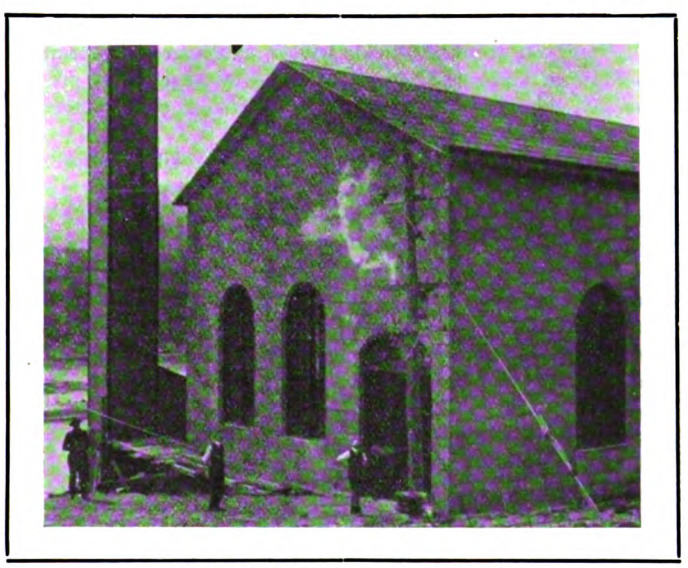

Fig. 1. Test of 6 foot, 25 ampere fuse.

Before leaving the station the current is stepped up to 33,500 volts by means of single-phase step-up transformers connected in delta. The step-down transformers at the sub-stations are connected part in delta and part in Y, without grounded neutral. The transmission line is of aluminum, the wires being strung on wooden cross-arms and wooden poles.

A telephone line is operated over the entire 56 miles of this transmission system. The line is strung on the transmission-line poles. This telephone circuit is of No. 6 B. & S. galvanized steel, is carried on brackets on each side of the pole, tied to a fairly heavy telephone trunk-line insulator, and is transposed between the poles every third section. The only protective devices on this line are ordinary telephone protective devices placed at the sub-stations, there being no protection for a man talking on the line should one of the high-tension wires happen to break, and fall across the telephone circuit.

It may be interesting to know that in the latter part of May tests were made on a telephone protective device arranged as follows: on the instrument end of the device was a 1-1 transformer, or heavy repeating coil, built to stand a pressure of 2,500 volts. Ahead of this transformer was a ground-plate cut-out consisting of copper blocks instead of the usual carbon blocks, and separated by two micas of 0.0055 of an inch in thickness. Ahead of the ground plate was a tubular fuse of about 10 amperes, and ahead of this was a long fuse of 25 amperes' capacity.

Tests were made by varying the length of the long fuse from 6 feet to 20 feet, and varying from 25 to 50 amperes. A separate telephone test-line of a few sections was put up to make this test, one side of the telephone circuit being strapped to one side of one of the transmission lines by means of a No. 10 copper wire, and the other side of the transmission line was then grounded. The ground-plate device of the protective apparatus also being grounded, 33,000 volts was then thrown on to the transmission line.

The long fuse operated, as well as the tubular fuse, and the ground-plates operated. Many tests were made, the machine current being held on for some 15 to 25 seconds. The telephone instruments on the test line had their receivers off, thus giving the effect of the instruments being in service, and on none of the tests was any part of an instrument damaged in any way.

This led us to the installation of one of these devices on the power-house end of our telephone line, but it was found that we could not prevent the induced current on the telephone line from arcing across the ground-plate equipment of the arrester,

Fig. 2. Reproduction of photograph taken at moment of rupture of 20 foot, 5 ampere fuse.

notwithstanding the fact that we increased the mica separators to five in number. The ground-plate apparatus would hold up at times for several hours, and at other times would arc across

*Abstract from a paper entitled "Some Experiences with Lightning and Static Strains on a 33,000 Volt Transmission System," presented at the 23d annual convention of the American Institute of Electrical Engineers, Milwaukee, Wis., May 28-31, 1906.

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immediately, thus showing that the induction effect on the telephone line was not constant, and for this reason the device was given up awaiting a further stage of development.

By means of an ordinary portable voltmeter, we found that the telephone line carried 775 volts between one side and the ground, just outside of the power station, and 995 volts just outside the Waterbury sub-station. One reason for the high voltage on this telephone line is that the transmission line is not transposed at all.

Fig. 3. Test of 50 ampere tubular fuse 1 foot long.

Figs. 1, 2 and 3 show three of these tests.

The one with the power station in the background shows the arcing of a 6 foot, 25-ampere fuse. The one showing the long arc between the poles is a 20 foot, 50-ampere fuse. The one showing the smaller arc near the pole is a 50-ampere tubular fuse about one foot in length.

NOT NUMBERED.

PATRICK, lately over, was working in the yards of a railroad. One day, according to *Judge's Library*, he happened to be in the yard office when the force was out. The telephone bell rang excitedly for some time, before Pat came to the conclusion that it ought to be answered. He approached the instrument very cautiously, and slowly put his mouth to the transmitter, as he had seen the boss often do.

"Hillo, there!" he called.

"Hello!" answered some one at some distant place. "Is this eight—six—ought—four—eight?"

"Aw, g'wan! Phat d'ye think Oi am, a box-car?" sarcastically replied Patrick.

UNDER THREAT OF COMPETITION DEFINITE REDUCTIONS ARE OFFERED BY BELL COMPANY IN CHICAGO.

IN the ordinance drafted and submitted by the Chicago Telephone Company to the city council gas, oil and electric light committee, as a basis for a 20-year franchise, which will soon be required if the company is to continue in operation, several lower rates than those now existing are promised. Broadly speaking, the ordinance provides for an extension of the present franchise to Jan. 8, 1929, the city to receive 3 per cent. of the gross receipts for the exchange business done within the city, and at the expiration of the extension of franchise to have the option of buying out the company. It is stated that at all times the city is to have the right to examine the books of the company as freely as if the city of Chicago were a stockholder in the company.

The company is to furnish without charge to the city telephone sets for police and fire departments, and is to furnish regular telephone service to departments of the City Hall and to the school board at a reduction of 25 per cent. from regular rates.

It is set forth that the ordinance shall not interfere with the right of the city to license telephone companies or to regulate rates, but it is stipulated that if the city takes such action the Chicago Telephone Company shall be absolved from its obligation to pay revenue to the city and to furnish the municipality with telephone facilities.

The ten party line residence service in the exchange is abolished, and changed from ten party to four party, the rate of 5 cents per day remaining the same.

The ten party business telephone, at a guaranteed rate of 10 cents per day, will be changed to two party lines, at a guaranteed rate of 10 cents a day with one message, or a guaranteed rate of 15 cents a day with three messages.

The four party residence rate at a guarantee of 10 cents a day will be reduced to 5 cents.

The two party guaranteed rate of 20 cents a day is reduced to 15 cents.

A new two party rate of 10 cents a day, with one message, is established.

The single line with a guarantee of 30 cents a day is reduced to 20 cents.

The guaranteed rate of 20 cents a day, with two calls, for single lines, is reduced to 15 cents. At least 97½ per cent. of all telephones in the city will be reduced from present rates, according to officials of the company.

The rates on trunk lines in private exchanges are reduced from $36 to $24 per year, and the cost of messages from private exchanges, now 3 cents a call, is reduced to 2 cents, after the first 300 messages in each month.

Two rates providing for unlimited messages will continue for private residences. The present rate of $100 a year for single lines is reduced to $72.

The two party residence rate of $75 is reduced to $60 and the four party unlimited service is abolished and advanced without changing the price to the two party service at $5 a month.

Desperate efforts to win public support are being made by the company. A petition which is being circulated broadcast reads as follows:

"As users of telephone service we are in favor of the passage of an ordinance permitting the Chicago Telephone Company to continue its business at the reduced rates proposed, covering the entire city limits with its exchange without toll charges and to develop, improve and extend its service." This is being taken about by linemen, operators, and in fact everyone of the company's employees who is believed to command sufficient influence to secure a signature. It is reported that they receive a bonus of one cent for each name added to the petition.

Mayor Dunne is said to have given out a newspaper interview in which the following statements were made:

"If the corporation now holding a franchise adheres to its position it looks as if the city would have to deal with some other company. With three companies in the field bidding for a franchise, and each company representing that it is backed by ample capital and willing and ready to give rates much lower than those offered by the Bell company, it seems highly probable that they know what they are talking about. I am forced to believe that the rates offered are not merely a "bluff."

The mayor is declared to have referred to the clause in the Chicago Telephone Company's proposition regarding the city taking over the plant as "a carefully arranged stone wall to prevent just what was apparently offered," and to have stated that "the permit will have to go to any responsible company which offers the lowest rates and gives proper assurances of efficiency."

INDEX FOR BACK NUMBERS OF THE AMERICAN TELEPHONE JOURNAL.

THE index for Volume 13 of THE AMERICAN TELEPHONE JOURNAL may be obtained on application by subscribers who wish to use it in a bound volume, or as a means of facilitating reference to desired articles in loose copies.

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IN THE OPERATING FIELD

CONSTRUCTION OF LINE RESTRAINED FOR ALLEGED BRIBERY.

AT Parsons, Kans., a restraining order has been issued "restraining the Missouri & Kansas Telephone Company from excavating in the streets or alleys of the city and from erecting and maintaining any poles or wires in the city of Parsons and from doing any other act or thing whatsoever under and by virtue of the said alleged ordinance."

Five members of the city council and the Bell telephone company are charged with collusion, and the petition makes charges of bribery and corruption and names the councilmen whom it charges therewith. The petition charges that the company bribed and corrupted Mayor Gabriel, Councilmen Larson, Wirt, Briggs and Falconer. It also alleges that one C. W. Daniels, an agent of the telephone company, on or about August 5, 1906, came to the city, stopped at the Rasbach Hotel, being registered under the assumed name of John D. Carson, and on a number of occasions entertained the Mayor and councilmen with lunch and intoxicating liquors.

GAIN IN MONTHLY EARNINGS OVER 1905 REPORTED BY CUYAHOGA COMPANY.

THE Cuyahoga Telephone Company, of Cleveland, Ohio, has just issued a statement of the earnings and expenses for the month of September. The report is especially interesting to all stockholders of Independent companies in that the month, as compared with the same month of 1905, shows a handsome increase in the amount of net earnings. The statement is given herewith:

	Sept., 1906.	Sept., 1905.	Increase.
Gross Earnings	$62,268.92	$51,710.22	$10,558.70
Expenses, including taxes and interest on loans	32,235.85	31,574.00	661.85
Net Earnings	$30,033.07	$20,136.22	$9,896.85
Interest on bonds	11,250.00	11,250.00	.....
Preferred dividend	6,618,00	4,011.07	2,606.93
Employee's dividend	.....	975.03	*975.03
Total	$17,868.00	$16,236.10	$1,631.90
Surplus for Common	12,165.07	3,900.12	8,264.95

*Decrease.

Considerable satisfaction with the plans which have brought about this result has, very naturally, been expressed by the stockholders.

THE PRAYER TO THE MIGHTY FACTORY.

THE following clever paragraphs, strange to say, were not originated by a Bell engineer or general manager whose usual anxiety to bring tardy goods from the shops devoted exclusively to the monopoly's product they so fervidly express. They were addressed to the wire manufacturers of the country by S. A. Hobson, vice-president of the Hobson Electric Co., Dallas, Tex. Mr. Hobson, also, has found it difficult at times to get prompt shipments, owing to the tremendous demand for material.

"We beseech thee, oh mighty Factory! ruling Potentate of the commercial world, to bend thy head and open thine ear, to our humble pleading; for relief from the persecutions of our indignant customers.

"We realize, oh Factory! that we are but thy humble servant, and that our daily acts should but please thy fancy. We further realize that we stand in danger of thy condemnation for having secured so many orders, but we feel that you should overlook our breach of discipline, because we acquired our order-getting habit during the days of thy reign when thou didst command that we send thee more business.

"This was during the great order famine when thy power was endangered.

"We were faithful then and didst have thy approbation and encouragement, but now that thou hast reached the zenith of thy power and glory, it darkens our hearts to feel that thou hast abandoned us to the mercy of our clamoring customers.

"Now, oh Factory, we pray thee to 'sit up and take notice' of our deplorable conditions, and grant us the blessings of a little bit better deliveries of our prayers for some of thy products, which we have hoped for during the past several moons.

"Now, oh mighty Producer, if thou wilt but answer our prayer, we will grant to thee all the glory and will shout glad hosannah throughout the land."

TRI-STATE COMPANY MAKES IMPORTANT EXTENSION OF ITS SYSTEM IN MINNESOTA.

BY a combination with several small telephone companies the Tri-State Company has practically excluded the Northwestern (Bell) Company from participating in the business of Freeborn County, Minnesota. The Tri-State Company has effected arrangements for making connections with the Emmons Telephone Company, the Manchester Telephone Company and the Moscow Telephone Company, which practically cover this portion of the State, each having a considerable number of subscribers. Negotiations for connecting with the Lerdal Telephone Company, now being conducted, the only remaining organization operating in the county, will, if successful, put the Tri-State Company in complete possession of the field. This will give people in Albert Lea an opportunity to talk with all sections of the surrounding region over lines which are exclusively Independent.

INTRODUCTION OF SINGLE PHASE ELECTRIC RAILWAYS DEVELOPS NEW PROBLEMS FOR TELEPHONE MEN.

(*Continued from page* 337.)

ley systems in operation, the telegraph companies were forced to abandon some newly-constructed lines and both telegraph and telephone companies will have to build quite a distance from the high current trolley wire. The questions as to who shall stand the expense of reconstruction and whether or not the telegraph and telephone companies have not prior rights will be taken to the courts for relief and damages.

Other telephone companies are alarmed at the announcement that the single phase system will soon be extended to many other trolley lines, because of the economy it permits. The single phase permits the use of a small copper trolley wire and also makes heavy feed wires along the track unnecessary. In case the trolley lines all adopt the single phase system the effect promises to be serious and the telephone and telegraph companies are greatly concerned. Experts are at work to overcome the difficulty, but they freely admit that the prospects of success are not flattering. The conditions are so extraordinary the courts will be asked to adjudicate the trouble between these conflicting interests.

Another feature which is likely to be productive of results if not looked after is the danger attending the unprotected crossings of high and low-tension wires on overhead systems. These have been brought to the attention of engineers for several years and yet there remains innumerable instances of hazardous construction in different parts of the country. There seems to be a disposition to take chances which is certain sooner or later to bring serious trouble and expense.

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NARROW is the distinction between invention and discovery when the purist in language attempts to apply the words to the results of work expended in the field of physical science. Doubt of the proper term for characterization, for example, of the latest report from the Pacific coast, that land of the marvellous and maximum telephone development, might well be awakened in the minds of the credulous. The statement is that certain scientists have demonstrated that when electrodes are placed within a man's stomach in a specified manner there is completed an electric battery of sufficient power to cause a microphone to produce distinctly audible sounds.

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AN INSTALLATION DETAIL.

OPEN, crossed and grounded in the wire chief's records are the words which, more frequently than any others, denote the expenditure of a telephone company's funds on that least satisfactory of accounts, maintenance. The absence of these words is almost always accompanied by a condition of plant, and, still more important, a state of organization of the working forces, which denotes a service satisfactory to subscribers and profitable to stockholders. The methods of securing this condition are well enough known, so that they could probably be stated with some considerable amount of definiteness by every man who has it in his power to apply them. In spite of this the all too numerous evidences of the failure to actually put them in force indicate the necessity of dwelling upon them and emphasizing their beneficial effects to such an extent that every employee of a telephone company shall be vividly impressed with their true significance and value.

The occurrence of the troubles for which these words stand as the record may occasionally be traced to defects in material. Yet such faults form in reality such a slight proportion of the total number that the blame may truthfully be said to rest invariably upon the same shoulders that are responsible for the expense—those of the officials of operating companies.

The origin of the troubles is in faulty installation. The prevention of their occurrence can only be attained through an assiduous and painstaking attention to the details of their work by all members of the installing force. Where so many soldered connections are in use as are found in the lines of a telephone exchange it is important that no man should be permitted to make such connections until he has shown his ability to perform this work with care and skill. One of the most competent installation foremen we have ever met once said that he could put in a job cheerfully and well without the help of a single man who knew Ohm's law, but he must have good mechanics. So it is that even in so small a matter as soldering important results are built up by the right performance of a sequence of minor operations. All wires and contacts should be, in the first place, absolutely clean before the heated copper is applied to them. If rosin core solder is to be used it should have been carefully preserved, in order that it may when used contain the full proportion of flux which has been settled upon as the best after careful experimenting by the manufacturer. If an acid paste is used all care should be exercised to place upon the parts to be joined only that amount which is necessary as a flux, and will be fully consumed when the heat and solder are applied. As is well known an excess of paste may cause not merely a corrosion of wires likely to lead ultimately to rupture, but in the presence of moisture forms a conducting film which in certain parts of an exchange equipment is an unavoidable cause of low insulation, and possibly of cross talk. Such a trouble as this has been known to baffle attempts at location, on account of the inconspicuous nature of its cause, for a most annoying length of time. In joining the surfaces to be soldered it is desirable to so firmly fix them together that at the time it is made the junction is practically perfect from an electrical standpoint. Implements, especially the soldering copper, should be maintained in perfect condition. A well tinned copper is essential for making firm joints, and incidentally is the greatest aid to that speed in execution which is productive of economical workmanship. When the copper is applied to the joint it should invariably be at the proper temperature, as indicated to the experienced eye by its color. In too many switchboards the ragged appearance of multiple cables produced by frequent wedging for the clearing of troubles is an indication that the workmen had too few irons in the fire, and in their haste used those which had become cold in their hands and would better have been for a moment idle. When all these things have been completed the installer will have soldered joints which will be neat in appearance, and thus pass the first and most frequently applied test of a good piece of work. But this is only incidental, a surface indication, and what he has really accomplished is an act which, when many times repeated, has far more influence than he realizes upon the ability of the exchange to give good service to its subscribers, make a profit for its stockholders, and pay good wages to its employees.

The result of the ability to do these things well, and the quality of mind which makes an installer do them well, is the attainment of practical efficiency in the branch of the great telephone field in which he is engaged. Such efficiency can only come after experience, but experience is not the sum of efforts, but the product of the efforts and the application of the workman, and so is not greatly limited by time. That to secure efficiency in the line we have traced is worthy of endeavor should be evident from a consideration of its most valuable ultimate results.

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THE TELEPHONE IN THE COURTS

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COMPANY MAY DISCRIMINATE BETWEEN SUBSCRIBERS OF DIFFERENT CLASSES.

We are doing business only in the limits of the incorporated town, but one or two subscribers who live outside the limits have applied to us for service. They live so far away that we cannot extend our line to their residences except at extra expense, and this one of them refuses to pay, making the claim that we are common carriers and obliged to furnish everybody service at equal rates. Is he correct in his claim? I. K. R.

WHILE telephone companies cannot lawfully discriminate between subscribers of the same class, they may make such discrimination without violating any legal principle between subscribers of different classes. If your company is not holding itself out as doing a telephone business outside of the incorporated town, it cannot be compelled to install telephones outside of the town on any terms whatever. It is not a common carrier as to the surrounding county under those circumstances. It therefore follows that if it chooses to install any telephones outside of the corporate limits, it may fix its own terms for so doing. This principle was upheld in the case of Krouch v. Arnett (Kan.), 79 P. 1086.

LINEMAN'S FAILURE TO USE STRAP.

A lineman in our employ was seriously injured by a shock of electricity which he received while upon one of our poles. The electricity came from an electric light wire which got crossed with our wire. The lineman had not fastened himself to the pole with the strap with which we usually provide our linemen, although he had it it with him and left it down at the bottom of the pole. The shock of electricity was so great that it knocked him off the pole and he was killed. The doctors say that the electric shock was great enough to have killed him anyway. Is his failure to use the strap a good defense for us? G. N. W.

IF you can show that the man would not have been killed had he used the strap, your defense is complete. But if, as you indicate, the shock was strong enough to have killed him even though he had used the strap, even though by its use he would have been prevented from falling from the pole, he would have a good case. It has been held that the failure of an employee to use a strap to fasten himself to the pole was immaterial when the electric shock was sufficient to cause death though he had not fallen. Rowe v. Taylorville Electric Co., 213 Ill 318, 72 N. E. 711.

EXCEPTIONS IN SURETY BOND.

IN one of the cities of the Middle West the council required a telephone company which had applied for a franchise to furnish a bond to protect the city and its citizens from damage. The bond furnished by the company contained the following clause:

"That the surety shall not be liable for any damages resulting from an act of God; or a mob, riot or civil commotion, or a public enemy, or from employes leaving the work being done in carrying out the terms of said ordinance, or so-called 'strikes' or labor difficulties; or from fire, lightning, tornado, or cyclones; or from injury to persons or property resulting from accident or negligence in the performance of said ordinance, or any part of it, and that the surety shall not be liable for the reconstruction or repair of any work or material damaged or destroyed by said causes or any of them, neither shall the surety be liable for the maintenance or operation of the plant proposed to be erected under the terms of said ordinanc."

The bond was at first accepted by the Common Council, but upon the mayor calling the council's attention to this clause, and stating that he would veto the resolution accepting it unless it was reconsidered, the council first reconsidered and then rejected the bond, thus leaving the telephone company without a franchise although it is said that a new bond will be given.

A consideration of this clause of the bond discloses that it would render the surety liable for any damage to the city or its citizens for which the telephone company was itself to blame. The surety was trying to guard himself, as he had a perfect right to do, against answering for damage produced by causes for which his principal was not responsible. The common law would protect the telephone company from damages caused in the ways excepted in the bond, and it is probable that even if a bond was given in which the above exceptions did not appear, the telephone company and its surety would be protected from damages arising in the manner specified.

LIBEL BY TELEPHONE COMPANY.

THE Memphis Telephone Company brought suit against the Cumberland Telephone and Telegraph Company for a series of alleged libelous publications made in the *Commercial Appeal*, a Memphis newspaper. A demurrer to the declaration was sustained and the suit dismissed on the ground that the publications were not libelous of themselves, and no special damages were averred.

The declaration averred that the defendant had owned and operated a telephone exchange in Memphis for more than twenty years before the organization of the plaintiff as a corporation, and claimed and enjoyed a monopoly of the telephone business there as the lessee of the American Bell Telephone Company; that the city, being dissatisfied with the rates of the defendant, granted a franchise to the plaintiff which proceeded at great expense to construct its exchange and solicited and received thousands of subscribers to its service; that on January 11, 1902, when the plaintiff's exchange was more than two-thirds completed, the defendant, for the purpose of destroying confidence in the plaintiff and its investment, caused to be printed the libel questioned. The alleged libel was as follows:

"SUPPORT THE PROMOTER.

"It took the promoters twenty years after the art of telephoning was discovered, to undertake the building of an exchange, and then only after trying to float twice its value in bonds and the same in stock. It will not take them twenty minutes to get out if they succeed in unloading this 'wad' of 'securities' on the 'dear public.' Subscribe for the service of the Cumberland Telephone & Telegraph Co., Telephone Building, Madison street. It has been with you twenty years and will be with you twenty more."

The Circuit Court of Appeals held that the lower court was right in sustaining the demurrer. The court considered that if there was any imputation in the language, it was limited to the promoters, and the language contained no reflection upon the new company, its credit, its stability, or its service. This conclusion was reached upon the ground that there was nothing libelous in the first and second statements even if applied to the company and that the third statement, if applied to the company, was inconsistent to the point of absurdity. Memphis Telephone Co. v. Comberland Tel. & Tel. Co., 145 Fed. 904.

THE BELL COMPANY ESTOPPED AT RICHMOND, INDIANA.

BECAUSE the Bell Telephone Company refused to put its wires underground in a conduit system occupied by the lines of the Home Telephone Company and other wire companies, and proceeded to reconstruct its overhead system, the City Council of Richmond has passed an ordinance requiring all telephone, telegraph and light companies to put their wires underground in the prescribed business section. The Bell company is ignoring the ordinance and going ahead with the reconstruction of the overhead system and the courts will be asked to decide the right of the council to force the wires underground.

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EXCEPTIONS IN SURETY BOND.

IN one of the cities of the Middle West the council required a telephone company which had applied for a franchise to furnish a bond to protect the city and its citizens from damage. The bond furnished by the company contained the following clause:

"That the surety shall not be liable for any damages resulting from an act of God; or a mob, riot or civil commotion, or a public enemy, or from employes leaving the work being done in carrying out the terms of said ordinance, or so-called 'strikes' or labor difficulties; or from fire, lightning, tornado, or cyclones; or from injury to persons or property resulting from accident or negligence in the performance of said ordinance, or any part of it, and that the surety shall not be liable for the reconstruction or repair of any work or material damaged or destroyed by said causes or any of them, neither shall the surety be liable for the maintenance or operation of the plant proposed to be erected under the terms of said ordinanc."

The bond was at first accepted by the Common Council, but upon the mayor calling the council's attention to this clause, and stating that he would veto the resolution accepting it unless it was reconsidered, the council first reconsidered and then rejected the bond, thus leaving the telephone company without a franchise although it is said that a new bond will be given.

A consideration of this clause of the bond discloses that it would render the surety liable for any damage to the city or its citizens for which the telephone company was itself to blame. The surety was trying to guard himself, as he had a perfect right to do, against answering for damage produced by causes for which his principal was not responsible. The common law would protect the telephone company from damages caused in the ways excepted in the bond, and it is probable that even if a bond was given in which the above exceptions did not appear, the telephone company and its surety would be protected from damages arising in the manner specified.

LIBEL BY TELEPHONE COMPANY.

THE Memphis Telephone Company brought suit against the Cumberland Telephone and Telegraph Company for a series of alleged libelous publications made in the *Commercial Appeal*, a Memphis newspaper. A demurrer to the declaration was sustained and the suit dismissed on the ground that the publications were not libelous of themselves, and no special damages were averred.

The declaration averred that the defendant had owned and operated a telephone exchange in Memphis for more than twenty years before the organization of the plaintiff as a corporation, and claimed and enjoyed a monopoly of the telephone business there as the lessee of the American Bell Telephone Company; that the city, being dissatisfied with the rates of the defendant, granted a franchise to the plaintiff which proceeded at great expense to construct its exchange and solicited and received thousands of subscribers to its service; that on January 11, 1902, when the plaintiff's exchange was more than two-thirds completed, the defendant, for the purpose of destroying confidence in the plaintiff and its investment, caused to be printed the libel questioned. The alleged libel was as follows:

"SUPPORT THE PROMOTER.

"It took the promoters twenty years after the art of telephoning was discovered, to undertake the building of an exchange, and then only after trying to float twice its value in bonds and the same in stock. It will not take them twenty minutes to get out if they succeed in unloading this 'wad' of 'securities' on the 'dear public.' Subscribe for the service of the Cumberland Telephone & Telegraph Co., Telephone Building, Madison street. It has been with you twenty years and will be with you twenty more."

The Circuit Court of Appeals held that the lower court was right in sustaining the demurrer. The court considered that if there was any imputation in the language, it was limited to the promoters, and the language contained no reflection upon the new company, its credit, its stability, or its service. This conclusion was reached upon the ground that there was nothing libelous in the first and second statements even if applied to the company and that the third statement, if applied to the company, was inconsistent to the point of absurdity. Memphis Telephone Co. v. Comberland Tel. & Tel. Co., 145 Fed. 904.

THE BELL COMPANY ESTOPPED AT RICHMOND, INDIANA.

BECAUSE the Bell Telephone Company refused to put its wires underground in a conduit system occupied by the lines of the Home Telephone Company and other wire companies, and proceeded to reconstruct its overhead system, the City Council of Richmond has passed an ordinance requiring all telephone, telegraph and light companies to put their wires underground in the prescribed business section. The Bell company is ignoring the ordinance and going ahead with the reconstruction of the overhead system and the courts will be asked to decide the right of the council to force the wires underground.

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QUERIES

ELECTROLYSIS.—(795.)

About three years ago I laid our main cables leading from the central office in four directions for about one-half to three-quarters of a mile, underground. We laid sewer pipe in a trench and then pulled the cable through that. We have never had any trouble until lately and we find that our cables E. C. and C. N. are in bad shape, being pitted in a number of places and rapidly getting noisy.

Some one has told me that this is electrolysis and is caused by the electric cars which have been running through the town for the last two years along the streets as taken by these cables, and indicated roughly in Fig. 795-*a*.

Will you kindly tell me what this trouble is, what causes it and how it can be remedied, as it is giving us a great deal of annoyance and trouble, and if it continues at the present rate we will soon be obliged to renew these cables. W. J. F.

Your trouble as you have described it is undoubtedly electrolysis, and we will endeavor to answer your questions as asked, i. e.: What it is; the cause; how it can be remedied.

First, electrolysis is the separation of any chemical compound into its constituents by means of an electrical current. Faraday, who was the author of the different terms used in connection with electrolysis, called the compound that is to be decomposed the electrolyte and the process electrolysis. Therefore in your case it is the decomposition of the lead sheathing on your cable by means of the electric current emanating from the return rail of the electric railway system.

It is evident that the current on the rail in endeavoring to return to earth finds a shorter path through the sheathing of your cable at some points than is possible for it to otherwise obtain. and it is the points at which thus current *leaves* the cable that the damage is resultant. Therefore it will be well to remember:

1st. A current flowing *from* the earth to a conductor imbedded therein causes no injurious action.

2d. That current traversing the length of the conductor will result in no damage.

3d. A current leaving the conductor and re-entering the earth, if it has a difference in potential of even a small fraction of a

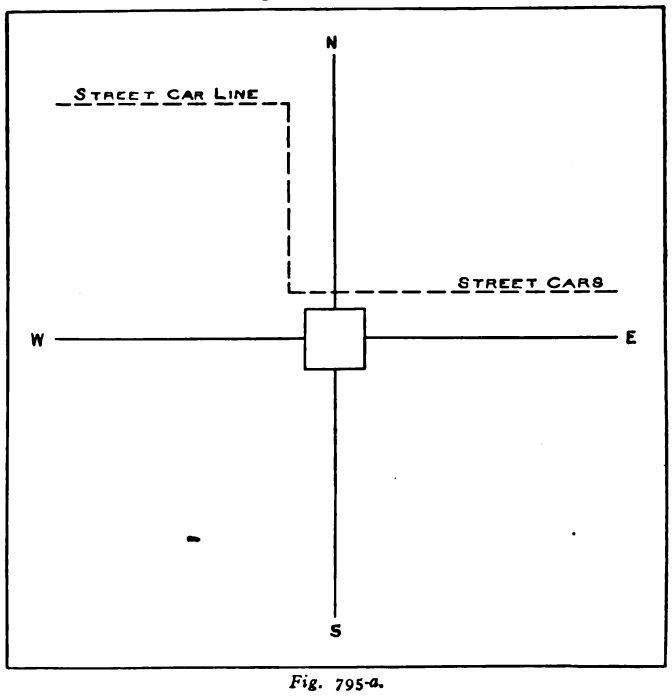

Fig. 795-a.

volt, may do damage that will in time culminate in serious disaster. . The effect is cumulative, and although the material may be carried away very slowly indeed it is only a question of time when the action, if continued, will produce dangerous pits in the cable sheath.

4th. That lead is the most susceptible of all metals to this electric corrosion.

5th. That electricity flows from positive to negative.

It is usual after determining whether there is a dangerous flow of current from the sheathing to the car rail or earth to run a heavy copper wire from the sheathing to the ground, attaching it well to a good ground plate buried in a good moist earth, allowing the current to take a path of low resistance from the

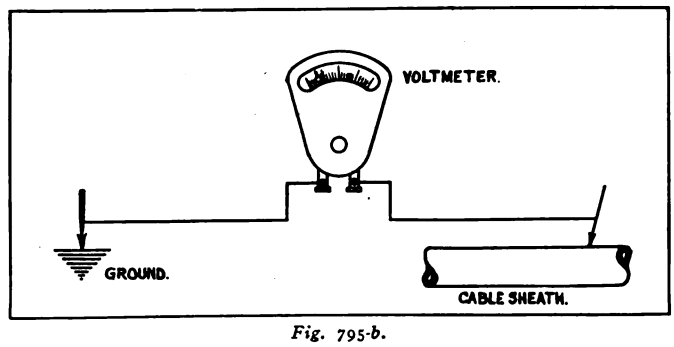

Fig. 795-b.

lead in the sheathing to the ground and not, as before, leaving the sheathing direct.

The usual means of determining the existence of a flow of current as well as its direction, is to proceed as follows:

Two steel pointed rods are used to form good connection to the cable sheathing and the ground. By means of wires attached, these sharp pointed rods form the terminals of a portable voltmeter having a scale reading, preferably, to three volts and not over five, so sub-divided that one may be able to read as finely as 1-100th of a volt if necessary. On connecting this arrangement as shown in the diagram Fig. 795-*b* should there be a difference of potential the needle of the voltmeter will kick in either one direction or the other. If necessary reverse the positions of the rods so as to allow the voltmeter to take the reading.

After noting the reading, notice whether the wire attached to the positive terminal of the instrument (marked +) goes to the rod in connection with the ground or the sheathing.

If the terminal marked + should be in conjunction with the sheathing when the reading is obtained it indicates that there is current flowing *from* the cable and provision should be made to give it a better path as previously outlined.

In making these tests it is not sufficient to make a single test and abide by the result. Conditions in your cable may vary with the general distribution of the electric railway load. This should be borne in mind and the complete situation learned in order that the ground may be properly placed.

BREAKING OF INSULATORS.—(796.)

Recently we have had trouble from the breaking of insulators on a new line. This occurs principally on corner poles, but we do not think the wires bear against the glass hard enough to snap it. Can you tell us if there is likely to be any defect in the glass, and if so, how we can know if it is present before we put the insulator on the pin? N. R.

If the wires are wrapped about the glass too tightly they very often cause breakage. There always exists more or less internal stress in the glass, which causes a very slight change in form to be more or less irregularly produced when the temperature is altered. If the glass is tightly bound at the groove this change of form cannot take place in the natural way to relieve the tension. The result is that the forces causing expansion are irregularly exerted, and they are sometimes strong enough to cause the insulator to be shattered. The wires should be wrapped firmly, but not twisted up hard all the way around the insulator.

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HERE IS MORE PROOF

We have tried other stations, but do not find them so satisfactory. The Gray Station gives distinct signals, causes very little trouble and is reasonably safe from burglary.

L. D. RICHARDSON, Gen. Supt.
Twin City Telephone Co.

GRAY TEL. PAY STA. CO. HARTFORD, CONN.

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WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

POSITION WANTED—As Assistant Manager or Superintendent of telephone exchange of two to eight hundred subscribers. Six years' experience, good habits and can give best of reference. Address Box 717, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York 717

AT LIBERTY—A1 telephone man, long experience at line, instrument, switchboard and trouble. Permanent position with Independent telephone company, not less than 300 telephones. East or South preferred. State size, equipment, etc., first letter. Address S. B. Fay, Fort Smith, Arkansas. 725

WANTED—Position by man and wife to take charge of telephone system. Man, technical education, seven years' practical experience in construction and management of local or common battery plants. Wife, five years' practical experience in operating and accounting. At present man employed as manager, wife as chief operator and accountant. Desire healthful location in Northwest States. Address Box 707, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 707

WANTED—Young man of 30 years, with both factory and field experience, is open for engagement January 1st. What have you? Particulars and references gladly given. Address Box 730, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York City. 730

WANTED---Continued

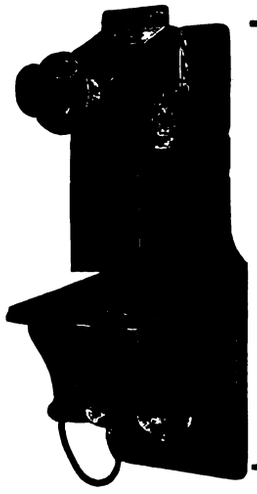
WANTED—General management of telephone proposition. Able to qualify as thoroughly practical in all branches of "operating plant" and economical business management. Fully alive to "revenue" opportunities and the value of earned dividends. Will substantiate fully claims of ability and capacity by referring to present business associates and others for whom I have worked. Experience extending over fifteen years. Address Box 718, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 718

AN expert on storage batteries, switchboard cables and heavy construction, with fourteen years' experience with Independent companies, now traveling for one of the largest Independent operating companies in the United States, wants a position as manager. Cannot consider less than $1,200 a year. Address Box 722, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 722

WANTED—Well educated young man, good appearance and references with some telephone experience. Write fully. Address Box 727, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 727

CABLE SPLICERS—Wanted capable splicers to work on paper telephone cables. Highest wages, $25 per week. For particulars address Box 728, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 728

WANTED—Telephone cable test man; $60. Address Box 729, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 729



THE WAY SOME PEOPLE TALK

You'd Think "Power" and "Complication" Are Synonymous

Well, they're not. BAIRD SHEET-STEEL CASH REGISTER PAY STATIONS have a powerful Lever and Spring movement to give loud, clear signals. But they're not complicated and they're so well built they don't get out of order.

Write To-day for Bulletins Nos. 36 and 51

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TELEPHONE PATENTS

SIGNALING SYSTEM.

Wesley E. Laird, Pittsfield, Mass., patents (No. 835,441, dated November 6, 1906; filed July 22, 1904; serial No. 217,627) and assigns to the Stanley Electric Manufacturing Company, Pittsfield, Mass., a signaling system.

This device is principally intended for selective signaling on a system employing a plurality of automatic indicators described in a previous patent issued to the same inventor, but may, however, be used on telephone lines. It covers a circuit changing mechanism in connection with special batteries at a central point for sending current impulses out over the line. A ratchet device in connection with three relays at each instrument is provided for making the necessary circuit changes for controlling the bells. The motion of the relay armatures is limited by the attachment of dash-pots to accomplish results specified in the patent.

TELEPHONE CALL BOX.

Anthony Van Wagenen, Sioux City, Ia., patents (No. 832,562; dated October 2, 1906; filed July 30, 1903; renewed March 3, 1906; serial No. 304,052) a telephone call box.

The inventor describes an automatic release to be employed in connection with a call box for automatic systems similar to that covered by his previously granted patent No. 702,751. The releasing mechanism, which is the basis of this later patent, is so designed as to be operated by the movement of an ordinary receiver hook, which forms a portion of the instrument.

ELECTRODE FOR BATTERY.

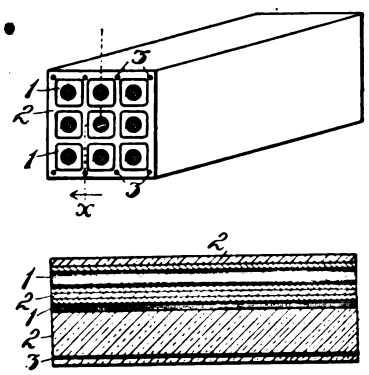
Isidor Kitsee, Philadelphia, a., patents (No. 827,914; dated Aug. 7, 1906; filed June 12, 1901; renewed May 3, 1905; serial No. 258,692) an improved electrode for electric batteries.

The inventor describes a plate consisting of carbon combined in a suitable manner with finely divided platinum, in order that the capacity of the latter material to aid depolarization may be fully utilized.

UNDERGROUND CONDUIT.

Horace B. Camp, Akron, O., patents (No. 833,870, dated October 23, 1906; filed October 3, 1905; serial No. 281,175) an underground conduit.

This patent has for its object a method of combining earthen-



ware ducts into a group by means of cement, strengthened by longitudinal rods. In the drawing (1, 1) are earthenware ducts, provided with circular central openings, and with rectangular sides having rounded corners. These are arranged with suitable spaces between them, which are filled with a cement composition. A layer of the same composition is placed about the entire structure. Longitudinal rods 3 are intended to be imbedded in the cement composition in close proximity to the top and bottom of the structure and placed out of alignment with the hollow ducts.

GROUND PLATE FOR PROTECTIVE APPARATUS.

Frederick R. Parker, Chicago, Ill., patents (No. 802,939; dated October 24, 1905; original application filed July 9, 1904; serial

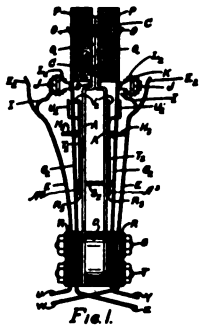


Fig. 1.

No. 215,933; divided and this application filed November 26, 1904; serial No. 234,401) and assigns to Frank B. Cook, Chicago, Ill., a ground plate for protective apparatus.

The inventor describes a ground plate formed of two brass bars or strips *A A*, which have a thickness in a preferred form of .032 inch, and are formed so as to take the place of both the usual iron mounting bar and the thin strip which in other types

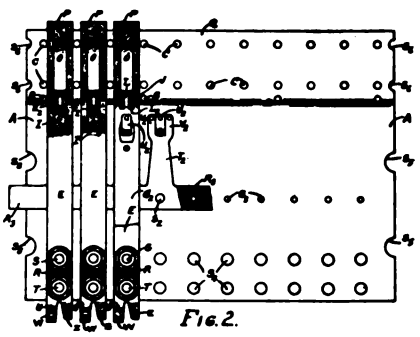


Fig. 2.

of arresters is secured thereto as a ground plate. Each strip *A* is provided with projecting points *C C*, formed out of the strip, and adapted to hold lightning arresters *P P* in place. Details of the spring mechanism for holding and making electrical connection with carbons, heat coils and also a special alarm circuit are shown in the drawings. These springs are also adapted to make connection with testing clips. Bushing *D*, placed on the bolts which hold the springs in place, holds the rear portions of the strips *A A* at the proper distance apart when nuts on the bolts *S T* are screwed up tight.

TELEPHONE CIRCUIT.

Milton W. Phillips, Ventura, Cal., patents (No. 832,746, dated October 9, 1906; filed February 20, 1906; serial No. 302,086) a secrecy device for party lines in a common battery system.

This invention covers a device embodying two circuit changing relays with a system of wiring including three retardation coils and a special hook switch, with nine contacts at each sub-station. On the removal of any receiver on the line from its hook the relays at other stations are intended to be actuated through a special local ground connection in order to keep the talking circuit open.

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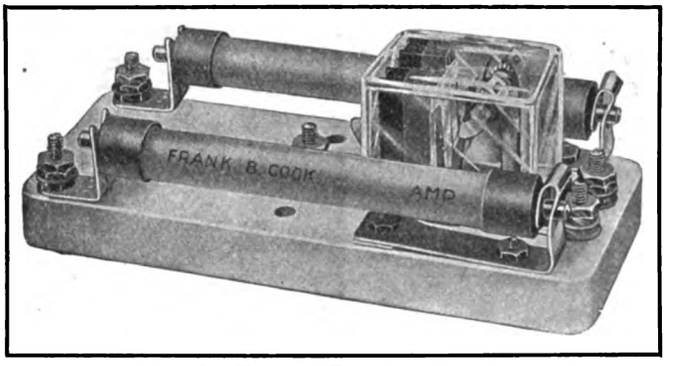
...ARE ALL COMBINED IN...

COOK'S Type B-4 Subscriber's Station Protector



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You can better afford to protect EVERY ONE of your telephones with

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than to pay the damages and costs that might be awarded in one single case of loss of life or property due to a discharge of current passing over your unprotected lines. "Contributory Negligence" and "reasonable care" are powerful factors in deciding damage suits against public service corporations.

Don't be caught napping. Write for prices to-day. DO IT NOW.

You'll be surprised at the small expense necessary to guarantee your company an "immunity bath" in case of a damage suit.

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

SETTING GUYS IN WINTER.

ONE minute and thirty seconds is said to be all the time which the young man whose picture appears in the centre of this page took to install in frozen ground the guy anchor behind which he is standing. The illustration is taken from a book recently prepared by the D. & T. Anchor Company, La Crosse, Wis., for the information of those who are interested in line construction. In this book it is said that the anchor illustrated was driven through thirty inches of frost, and that the pole to which it is attached is 65 ft. high, and carries six heavy power cables running between North and South La Crosse, Wis.

The D. & T. Anchor is especially convenient in any locations where the well known method of burying a stub is not available. For instance, in a private lawn the guy anchor can be set where there would be no possibility of obtaining the owner's permission to tear up the sod and set a guy in the old way. This anchor can also be easily set in the soil beneath a pavement or brick wall; as by removing one half a brick, or cutting a hole of small size, it is readily driven through the opening and firmly set.

Details concerning the mechanical strength and holding power of the anchor in various sizes are given in the booklet, which may be obtained by writing to the company.

Guy Fastening, from a Photograph Taken After a Demonstration of the Practicability of Using a D. & T. Anchor in Frozen Ground.

THE CENTURY TELEPHONE CONSTRUCTION COMPANY, of Buffalo, New York, is sending out a card in which it announces that it has again commenced operation and expects in a few weeks to overcome the delay occasioned by the fire which occurred in its factory October 6th. The company also thanks its customers for the loyal manner in which they have given their support during this time and advises that the same standard of quality which has always characterized Century equipment will be maintained.

QUEEN & COMPANY, Philadelphia, Pa., have within a short time issued an attractively arranged booklet, which gives descriptions and illustrations of a number of types of standard testing sets. In its pages are made clear the various tests to which each set is especially adapted, and a brief outline of the specifications under which it is constructed has been presented. The company will be pleased to send copies to telephone men who are interested in equipment for accurate testing.

THE INTERNATIONAL TELEPHONE MANUFACTURING COMPANY, Chicago, Ill., has recently reported orders from a number of telephone companies in foreign countries. Among these may be mentioned the following in Canada: The Municipality of Neepawa, Man.; The St. Catherine and St. Basile Telephone Companies of St. Catherine and St. Basile, Quebec; also La Compañia Telefonica Do Estado De Sao Paulo, Sao Paulo, Brazil; Rosalia Telephone Co., Rosalia, Mexico; The Athens E. L. & T. Co., Athens, Greece. This company also has practically ready for shipment a 4,800 line capacity, 1,200 installed, central energy lamp signal multiple switchboard equipment, with additional telephones, for the municipal telephone system at Port Arthur, Ont., and a similar equipment for Fort William, Ont., and a 500 line equipment for West Fort, Ont.

THE ELECTRICAL TRADES EXPOSITION COMPANY, which is to conduct the great electrical show at the Coliseum, in Chicago, January 14th to 26th, 1907, has recently sent out a folder containing reproductions of clippings from two of Chicago's leading papers. These call attention to the especially large amount of telephone apparatus which is to be exhibited. Chicago at at the present time is taking a keen interest in telephone matters, and it is is for this reason that equipment for telephone systems will receive an unusual amount of attention.

THE GENERAL ELECTRIC COMPANY, Schenectady, N. Y., is announcing a general advance in prices of electrical apparatus and supplies, and issues a warning that the present announcement is not unlikely to be followed by still others of a similar character, if the prevailing market conditions continue. Attention is called to the fact that prices in the electrical trade continue to show a distinct upward tendency in sympathy with the advance which has taken place in the prices of all raw material, and it is for this reason that orders for future delivery can only be placed in many instances at a considerable advance over present market quotations.

THE SWEDISH-AMERICAN TELEPHONE COMPANY, Chicago, Ill., has prepared a second edition of its very interesting book entitled "Rural Telephone." This contains a great deal of general information, which has been carefully prepared for those about to organize companies, and build lines for the operation of telephone systems for connections between farms. Very complete directions for performing the different kinds of work which are necessary are given. The book is made more interesting by illustrations of all apparatus and material needed, and diagrams which show how to make all necessary electrical connections. It will be sent without charge to all persons interested.

MATHIAS KLEIN & SONS, 87-89 West Van Buren street, Chicago, Ill., have prepared a leaflet which gives dimensions and prices of electricians' gimlets and bits. Occasions are constantly arising in telephone exchanges for renewing the stock of this apparatus, or extending the range of sizes kept on hand, and this list may be conveniently used as reference by those who have occasion to purchase these tools.

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Talks With The Buyer—No. 2

Yesterday I received a letter which said "Your Talk No. 1 is pretty good "Hot Air," but what I want to know is how can you save me money." From several letters received along this line, I see that collectively you are all "from Missouri"—so am I—shake. I cannot tell you in such limited space even the smallest part of the good things we have to offer you. I will only mention one now.

What kind of wood pins are you buying? If oak, you will admit you need a better one. If Locust, you know the price is awful. We offer you a better pin than either for considerably less cost than Locust. We control the output of mills manufacturing the Bois d'Arc Pins. It is a kind of orange wood. Close grained, tough and with life everlasting.

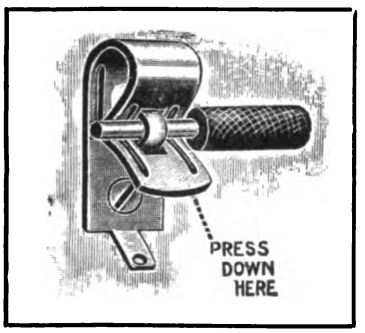
We can ship you immediately a thousand or a carload out of stock here in St. Louis at $14.50 per M in lots of less than 2,500, to $13.00 per M in lots of 10,000 and over for 1¼ x 8 inch telephone size.

Better send us your order to-day for as many as you can use. Include in the order the rest of the materials you were going to order elsewhere, for we guarantee that no legitimate competitor can undersell us on any item and we can save you money on many items. Your orders will be shipped promptly.

THE SALES MANAGER.

CENTRAL TELEPHONE & ELECTRIC CO., THE UP-TO-DATE TELEPHONE HOUSE 2131-33-35-37 LUCAS AVENUE **ST. LOUIS, MO.**

¶ You've often WISHT for something like this. AFFIXT to dry batteries, distributing boards, terminals, protectors, etc., every wire connected is GRIPT as in a vise. Not the least dirt or corrosion will MATERIALIZE, THO the connection be subjected to the hardest usage. You'll be SURPRIZED how THOROLY THE FAHNESTOCK SPRING BINDING POST acts as a battery connector and on the other devices mentioned. ¶ If you haven't tried them you don't know what you've MIST. And you should INSTIL it in the mind of your dealer that they're to be put THRU with your next order. ¶ Write for our CATALOG. It's FREE. We make a number of sizes and styles for wires of various CALIBER and for different uses. Write now.



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WITH THIS RELIABLE TIMING INSTRUMENT

The Calculagraph

in your exchange you can greatly increase the revenue from toll messages. The hundreds of overtime charges that are overlooked by busy operators are exactly determined by this instrument. The record of elapsed time is printed on the toll ticket ready for filing.

It Makes No Clerical Errors.

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IN THE MANUFACTURING FIELD

FEATURES OF CABLE HANGING.

IN order that the difference between the Swisher marlin cable hanger and the old style hanger might be clearly shown, its manufacturer, the W. G. Nagel Electric Company, Toledo, O., has prepared the illustrations shown upon this page. These indicate the difference not only between the two types of hangers, but between the methods of placing a marlin about a cable. Among the advantages which the company claims for the Swisher hanger is its ability to withstand a very heavy strain. It is true that under normal conditions the amount of weight which must be supported by a single hanger is limited to a figure which is not very large; but construction men are familiar with the various accidents which occur to put an unusually heavy strain upon a limited section of cable. For instance, the fall from a tree of a heavy branch is a by no means unusual cause of a condition which causes the rupture of several hooks and leaves unsupported a considerable length of cable.

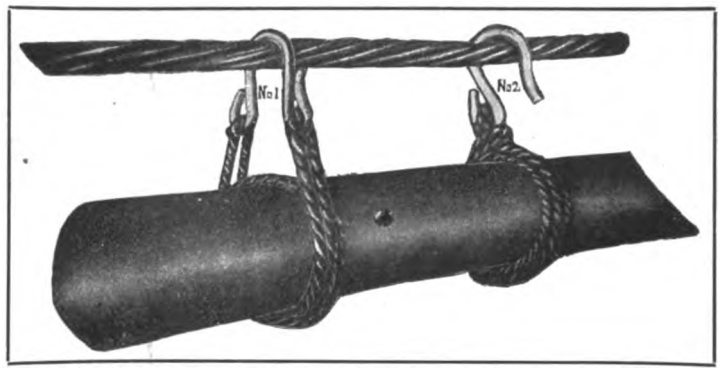

Fig. 2. Comparison of Swisher marlin hanger (No. 1) with open hook type.

With the Swisher hanger there is never experienced any trouble from the catching in hooks of an overhead wire which is being strung upon cross arms located above the cable. In the matter of the cost of hanging cable when this appliance is used, the company calls attention to the fact that it is not necessary for a man to ride out on the messenger to close the hooks. This fact alone makes it possible to effect considerable savings in the cost of cable hanging. The normal closed form of the hook makes it also possible to remove cable without relaxing the hook, and consequently this also can be done without sending a man out over the messenger. When the cable is installed the marlin is wrapped about its sheath in a half hitch, as shown in Fig. 2. The first knot is then brought from the top of the cable to the bottom hook, ready to be placed over the messenger. The hook is then hung over the messenger wire, and in this open loop is placed the loop end of the marlin, as shown in Fig. 4. All of these processes can be carried out in almost an instant. The greater the strain put upon the hanger the more securely does it hold the cable, so that there is little danger that the hooks will slip. Another advantage is that it brings the cable in perfect alinement with the messenger strand, thus equalizing the strain on the marlin and allowing the entire strength of the doubled strand to be utilized. Further information concerning this interesting piece of construction material may be obtained by writing to the company.

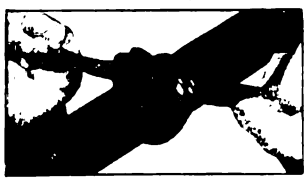

Fig. 2. Wrapping the marlin.

THE AUTOMATIC ELECTRIC COMPANY, Chicago, Ill., has established a new department, as described in the preface of a recently issued book treating the subject of magneto telephones. The manufacture of this class of apparatus has been undertaken owing to the demand for instruments of this type in small exchanges operated by some companies which own automatic switchboards in large places. The bulletin issued to describe the first apparatus of this type manufactured by the company contains very complete and well illustrated descriptions of the apparatus, including various types of instruments for direct line, divided circuit and four party selective service, as well as showing in detail the construction of the various parts employed. It is very attractively arranged, and contains so much information of general interest that the company is sending out a great many copies.

Fig. 3. Bringing the knot up to the hook.

THE F. BISSELL CO., of Toledo, O., expects to have ready for mailing two large new catalogues by New Year's. A special catalogue of about 1,000 pages will be devoted to electrical supplies, while the other catalogue will be devoted to electric railway material.

THE BLAKE SIGNAL & MANUFACTURING COMPANY, 246 Summer street, Boston, Mass., has recently received a large number of contracts for its well-known system of electric railway signals, to be used in connection with telephone systems for train despatching. It is said that interurban roads are coming to recognize these systems as a very valuable supplement to the telephone line, as the signals enable the despatcher to stop a car at any telephone point for orders, thus saving much time, and adding to the safety of operation. Incidentally this combined system embraces operating features which make the use of telephones for despatching more popular, and thereby increase the demand for telephones for this purpose. So rapidly is the realization of these facts spreading among railway companies, that during the last month contracts to the amount of $12,060 were signed for the Blake equipment by various roads in the east and middle west.

Fig. 4. The final operation.

THE HOLTZER-CABOT ELECTRIC COMPANY, Boston, Mass., and 395-397 Dearborn street, Chicago, Ill., is distributing a very attractive folder bearing the title "Twelve Timely Telephone Topics." It describes a number of the standard specialties made by this company, including ringers, the loud ringing extension bells which have been found so useful in many localities, receivers, transmitters, wall sets, etc., and also gives prices on the Lillie wire connectors, which are sold by this company.

THE WESCO SUPPLY COMPANY, St. Louis, Mo., has issued a list of prices, which contains no less than 23 pages of matter which should be interesting to telephone companies. The field of general construction is well covered, and prices are given on telephone parts, batteries, wire and other material used on inside work. It is issued in accordance with the company's policy of keeping before its customers the latest figures on material liable to fluctuation in price, and is thus very useful to purchasers. The company will be pleased to send this list of prices to all telephone men who write for it.

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Form G-90-E. For Small Exchanges, Rentals only.
Form G-90-F. For Small Exchanges, Tolls only.
Form G-90-G. One subscriber to a sheet; carries account 4 years.
Form G-90-H. One subscriber to a sheet; carries account 12 years.
Form G-90-I. For Small Exchanges; Bound Books; carry 12 subscribers on a page for 1 year.

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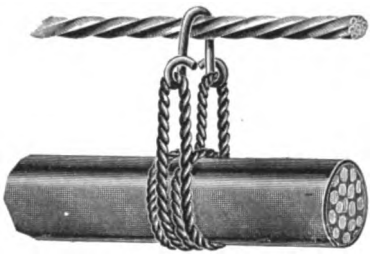
"National" Cable Hangers



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The acquisition of this new yard enables us to ship poles by all railroads or by the lake routes, thereby enabling us to give the best delivered prices.

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In many cases poles can be shipped by car-ferry, making possible a great saving in cases of shipment to Eastern points.

We are wholesalers exclusively, shipping in car lots only.

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KELLOGG SWITCHBOARD & SUPPLY CO.
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THE WEEK'S MESSAGES

NEW COMPANIES.

ASHTON, ILL.—A new telephone company has been formed by the business men of Ashton. It has been granted a thirty-five year franchise by the village board. Among those interested in the new company are William Weiner and George H. Kersten.

FREEDOM, IND.—Articles of incorporation have been filed by the Farmers' Mutual Telephone Company. The company will construct and operate telephone lines in Freedom and Owen counties. It has an authorized capital stock of $200.00, and the incorporators are Jonathan Branham, John W. Pryor and Frank C. Dunn.

TELL CITY, IND.—The Citizens' Telephone Company, Tell City, Ind., has been incorporated with a capital stock of $10,000. The directors are Vincent Smith, Tobias Simion, John Moutschka, George Mann and August Kalbrier.

GENEVA, KAS.—The Geneva Rural Telephone Company has been organized with C. L. Knowlton as president; D. D. Spicer, treasurer; and George Tippon, secretary.

ROYAL, LA.—Articles of incorporation have been filed by the Winnfield Parish Telephone Company. Its principal place of business will be located at Royal, and lines will be built throughout Louisiana. The company's capital stock is placed at $5,000, and the following directors have been elected: C. W. Smith, W. W. McCarty, J. J. Thornton, J. W. Higdon and S. R. Newsom.

RICH HILL, MO.—The Hickory Hollow Telephone Company, of Rich Hill, has been incorporated with a capital stock of $500. The incorporators are Grant Stine, J. L. Gander, C. F. Kienberger and others.

OMAHA, NEB.—The Independent Telephone Company, formed for the purpose of operating a telephone system under the franchise recently granted by the people of Omaha, has filed articles of incorporation. The incorporators are T. E. Parmelee, T. H. Pollock, Stockton Heth, W. C. Bullard and Frank W. Judson. Mr. Parmelee is temporary president, Mr. Bullard vice-president, and Mr. Heth secretary and treasurer. The capital stock of the company is $2,000,000, divided into 20,000 shares at $100 each. It is provided that $1,000,000 of the stock must be taken up and paid for within a year, but the corporation is completed when $25,000 worth is subscribed and paid for. The articles of incorporation give it power to conduct a local and long distance telephone business.

KNOWLTON, N. J.—Articles of incorporation have been filed by the Delaware & Belvidere Telephone & Improvement Company, of Knowlton. The capital stock is placed at $2,000, and the incorporators are C. J. Quigg, F. Brisbane, M. C. Allen, G. J. Prah, J. E. Albertson, J. H. Albertson and L. R. Keineuour. The company is to construct and maintain telephone and telegraph lines in the State of New Jersey.

TRUMANSBURG, N. Y.—The Trumansburg Citizens Telephone Company has been incorporated by R. J. Hunt, Trumansburg, N. Y.; William J. Garvey, E. B. Rogers, Elmira, N. Y., and others. The company has an authorized capital of $5,000.

DUNSEITH, N. D.—The Dunseith Hardware & Telephone Company has been incorporated with a capital stock of $25,000. Among the incorporators are John Douglas, Dunseith; C. R. Gailfus, C. I. F. Wagner, Rolla.

GRAFTON, N. D.—An Independent Telephone Company is being organized by the farmers living west of Grafton, N. D.

MOHALL, N. D.—The Cut Bank Farmers' Mutual Telephone Company, Mohall, N. D., with a capital stock of $25,000, has filed articles of incorporation. The incorporators are P. L. Peterson, John Johnson, J. L. Dalseith, L. H. Haugan, R. Halvorson, H. Halvorson and M. H. Haugan, Mohall.

CANAL DOVER, O.—A new Independent telephone company is being organized by the farmers in the vicinity of Winfield. The company will be known as the Dover-Winfield Telephone Company, and it is its intention to construct lines from Winfield to Canal Dover, at which point it is probable connections will be made with the Tuscarawas County Telephone Company. The following officers have been elected: O. S. Welty, president; J. E. Richardson, secretary; Fred Espenschied, treasurer.

OKLAHOMA CITY, OKLA.—The Deep Fork Telephone Company, with its principal place of business at Oklahoma City, has been incorporated with a capital stock of $5,000. The directors are J. T. Pierce, C. F. Woodward and R. W. Clark, of Oklahoma City.

RINGWOOD, OKLA.—The Ringwood Telephone & Telegraph Company, of Ringwood, has been incorporated with a capital stock of $500. Among the incorporators are E. T. Wales, E. Frazier, P. H. File, F. W. Watson and W. W. Skadden.

LEWISTON, PA.—The manager of the United Telephone Company has received a charter from the Commonwealth of Pennsylvania incorporating the Eastern Perry Telephone & Telegraph Company. The new company will construct twenty-two miles of line, commencing at Montgomery's Ferry, and taking in New Buffalo, Duncannon, Marysville and Benvenue. This will give the United subscribers direct communication with Harrisburg.

WESTMORELAND, TENN.—An Independent telephone company has been organized by citizens of Westmoreland.

RENTON, WASH.—Articles of incorporation have been filed by the Renton Independent Telephone & Telegraph Company, of Renton. Its capital stock is placed at $10,000, and the following are among the incorporators: A. T. West, E. L. Heath and Peter MacRae.

SULLIVAN, WIS.—The Sullivan Telephone Company has been incorporated with a capital stock of $10,000. The incorporators are W. E. Blumenstein, Paul R. McKee and John A. Friedel.

JACKSON, WYO.—The Jackson Valley Telephone Company, with its principal place of business at Jackson, Wyo., has been incorporated with a capital stock of $5,000, divided into two hundred shares of the par value of $25.00 per share, full paid and non-assessable. The following trustees have been elected: S. N. Leek, Abraham Ward, J. A. Adams, Fred Lovejoy and W. W. Smith.

ST. CATHARINES, ONT., CAN.—Plans are being considered for the establishment of a municipal telephone system to cover the Niagara district, the central office to be located either in St. Catharine's or Welland.

THOROLD, ONT., CAN.—A meeting was recently held by the Thorold Board of Trade to discuss the question of establishing a private telephone system to be run in connection with the electric light and waterworks plant.

FINANCIAL.

LIBERTYVILLE, ILL.—The Lake County Telephone Company, of Libertyville, has increased its capital stock from $10,000 to $25,000.

LIBERTY, ME.—The Liberty & Belfast Telegraph & Telephone Company has increased its capital stock from $500.00 to $7,000.00.

MT. VERNON, O.—The capital stock of the Mt. Vernon Telephone Company has been increased from $150,000 to $250,000. The new capital will be used in the extension of the company's lines.

PORTSMOUTH, O.—The Portsmouth Telephone Company has increased its capital stock from $100,000 to $200,000.

GREEN BAY, WIS.—The Brown County Telephone Company has declared a semi-annual dividend of 6 per cent.

CHIHUAHUA, MEXICO.—The Chihuahua Telephone Company has declared a dividend of 20 per cent. on its capitalization of $30,000.

FRANCHISES.

LAMAR, COL.—Application for a franchise to construct and operate a telephone system at Lamar has been made by the Colorado and Eastern Telephone & Telegraph Company.

BENTON HARBOR, MICH.—Application for a franchise to construct a telephone system at Benton Harbor has been made by the Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y.

GETTYSBURG, S. D.—The Board of Trustees of Gettysburg has granted to the Potter County Telephone Company a franchise to construct a telephone system at that city. It is the intention of the company to also construct a number of rural lines out of the city.

MILWAUKEE, WIS.—Despite the active opposition of the Bell Telephone Company, the Milwaukee Independent Telephone Company has been granted permission to maintain a telephone system in Milwaukee.

ELECTIONS.

CUBA, ILL.—The following officers and directors have been elected by the Cuba Central Telephone Company: President, W. L. Shurtleff; secretary-treasurer, M. E. Scott. Directors: O. R. Grady, N. A. Rowden and J. Beam.

CANNONSVILLE, N. Y.—The Cannonsville Telephone Company has elected the following officers and directors: Charles K. Liddle, president; B. S. Boyd, vice president; Austin Owens, secretary; Howard Huntington, treasurer. Directors: Charles Watson, George Seymour and George Keeler.

SPRINGVILLE, N. Y.—At the annual meeting of the stockholders of the Springville Telephone Company the following officers and directors were elected: President, M. N. Brooks; secretary, H. Taylor; treasurer, I. H. Vail; general manager, F. H. Bruce. Directors: M. N. Brooks, F. H. Bruce, G. W. Gillett, J. W. Smith, I. H. Vail, H. Taylor and W. W. Blakeley.

MISCELLANEOUS.

SHELBYVILLE, KY.—The Shelby County Telephone Company, better known as the Home Telephone Company, has been purchased by the following gentlemen: W. J. Thomas, C. S. Weakley, J. S. Turner, E. J. Doss, B. J. Thomas and others. The officers of the company are W. J. Thomas, president; J. S. Turner, vice president; E. J. Doss, secretary, and J. C. Burnett, treasurer.

ST. PETER, MINN.—The Citizens' Telephone Company, of Mankato, has made connections with the St. Peter exchange through the Tri-State

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THE VALENTINE-CLARK CO.

INCORPORATED - 1892.

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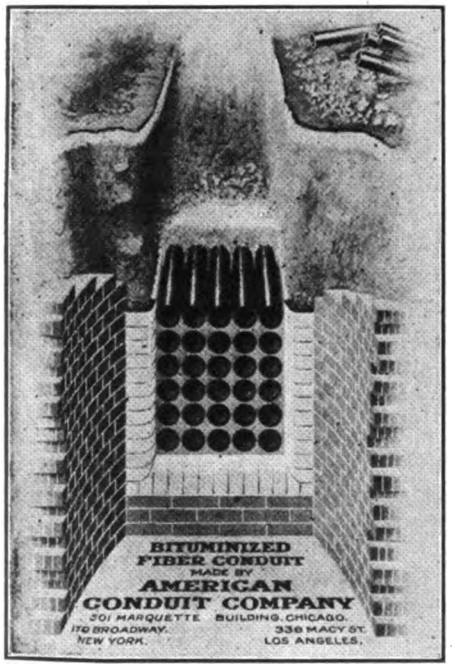

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25 YEARS HAVE WE BEEN PRODUCING POLES. WRITE US

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3 to 6 in. Tops
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POLES

20 and 25 foot lengths for rural telephone lines a specialty.

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STANDARD PORTABLE DIRECT READING

Voltmeters, Ammeters, Millivoltmeters, Voltammeters, Milammeters, Ohmmeters, Portable Galvanometers, Ground Detectors and Circuit Testers.

Our Portable Instruments are recognized as THE STANDARD the world over. Our STATION VOLTMETERS AND AMMETERS are unsurpassed in point of extreme accuracy and lowest consumption of energy.

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Main Office and Works, Waverly Park, NEWARK, N. J.

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THE WEEK'S MESSAGES

Company. Through the St. Peter exchange it also connects with the large Nicollet county system, which puts 1,700 more subscribers in communication with its patrons.

ASHLAND, N. H.—Connections have been established between the Citizens' Telephone Company and the Baker's River Telephone Company.

COOPERSTOWN, N. D.—The Cooperstown telephone exchange, and all the country lines, together with the Binford exchange and rural lines running therefrom, have been sold by A. Goff to a syndicate of Cooperstown business men. The new owners will make improvements to the system.

DAYTON, O.—A great number of improvements in its local service are planned by the Home Telephone Company of Dayton.

QUAKER CITY, O.—The telephone system owned by J. W. Carpenter at Quaker City has been purchased by R. S. Deal and Louis Hunt, of Spencer Station.

BRYAN, TEXAS.—The Long Distance Telephone Company is preparing to extend its service in this town and expects to be giving Independent service to all of the business houses within a short time.

GORDON, WIS.—Connections have been made by the Douglas County Telephone Company with Gordon.

KARLSBORG, WIS.—The Frey, Karlsborg, Webster Telephone Company has changed its name to the Burnett County Telephone Company. It has made arrangements to connect with the Tri-State Telephone Company at Grantsburg.

PERSONAL.

EDWARD O. HUSSEY has been appointed manager for the Sunset Telephone Company at Healdsburg, Cal.

BERNARD SCHNEIDER has been made local manager for the Wisconsin Telephone Company at Oconto, Wis.

W. S. SMITH has been made district manager fo the Wisconsin Telephone Company, with headquarters at Green Bay, Wis.

JAY TURNER has been appointed wire chief for the Northwestern Telephone Exchange Company at Albert Lea, Minn.

C. A. WESTON has recently been promoted to the position of manager of the New England Telephone and Telegraph Company's exchange at Rochester, N. H.

New Construction in the Field

DENVER, COL.—It is the intention of the Automatic Telephone Company to commence construction work on its system at once.

FRANKLIN, GA.—The Gainesboro Telephone Company is building a line between Franklin and Newman.

ILO, IDAHO.—The lines of the Nez Perce Co-operative Telephone Company are being extended in Ilo.

METAMORA, ILL.—The Metamora Telephone Company, which has recently spent $1,000 in overhauling its city lines, expects to make many improvements in its rural lines.

INDIANAPOLIS, IND.—The Lake Erie & Western Railroad Company is planning the installation of a system of telephones for the more perfect handling of its trains. The system will begin at Indianapolis and extend to Tipton and later to La Porte.

ANN ARBOR, MICH.—A line from Dexter to Silver Lake is one of the improvements planned by the Washtenaw Home Telephone Company of Ann Arbor, Mich.

BRADLEY, MICH.—A new line is being constructed between Hopkins and Bradley by the Citizens' Telephone Company.

MARLETTE, MICH.—The Independent Telephone Company expects to make improvements in its system at Marlette.

WEST BRANCH, MICH.—The Northeastern Telephone and Telegraph Company, which has made the Edwards line a part of the West Branch exchange, is preparing to extend its Selkirk line for several miles.

WIXOM, MICH.—The Northville Telephone Company is building a line to Wixom.

ELY, MINN.—The system of the Range Telephone Company is being entirely rebuilt at Ely. A line is also being constructed to Sellwood and the Shagawa mine.

GROVE CITY, MINN.—The lines of the Grove City and Rosendale Telephone Exchange Company are being extended.

OAKLAND, MINN.—The Four Corners Telephone Company is to install a new switchboard.

PONSFORD, MINN.—New lines are being constructed by the Farmers' Telephone Company.

RACINE, MINN.—The Peoples' Telephone Company is to make many improvements in its system at Racine and the surrounding country.

ST. CLOUD, MINN.—The lines of the St. Augusta Rural Telephone Company have been entirely rebuilt, and the company is now prepared to give an up-to-date service.

ST. PETER, MINN.—The Nicollet County Telephone Company intends to build a country line along the Fort road. It will be ten miles in length, will have two metallic circuits, and serve about forty subscribers.

VERONA, MISS.—The Independent Telephone Exchange at Verona is being entirely rebuilt, and will be made thoroughly up-to-date in all particulars.

ST. JOSEPH, MO.—It is the intention of the Citizens' Telephone Company to entirely rebuild its plant.

WEST PLAINS, MO.—A new farmers' line is being constructed by the West Plains Telephone Company.

LINCOLN, NEB.—New metallic, copper long-distance lines to Lincoln from Tecumseh have been constructed by the Johnson County Home Telephone Company.

STROMSBURG, NEB.—The Independent Telephone Company of Stromsburg is considering the advisability of extending its lines to Central City.

TALMAGE, NEB.—Many improvements and extensions in its system are under way by the Independent Telephone Company at Talmage.

CANNONSVILLE, N. Y.—The Cannonsville Telephone Company has constructed a line from Cannonsville to Deposit.

DELHI, N. Y.—It is the intention of the Delaware & Otsego Telephone Company to extend its lines to Arkville, where connections will be made with the Standard Company of Kingston.

NORWOOD, N. C.—Lines are being constructed by the Norwood Telephone Company to Wadesboro, and exchanges will be installed at Ansonville and Cedar Hill.

BRUNSWICK, O.—The Richfield Telephone Company has constructed a line from Richfield to Brunswick.

COLUMBUS GROVE, OHIO.—The Mutual Telephone Company, organized some time ago, is soon to commence the construction of its system.

PASSER, PA.—Many improvements in its system are planned by the Rural Telephone Company of Passer, Pa.

WENATCHEE, WASH.—It is the intention of the Farmers' Telephone and Telegraph Company to extend its lines to Peshastin.

CHARLESTON, W. VA.—The Charleston Home Telephone Company contemplates the expenditure of $20,000 in improving its system at Charleston. It is also rebuilding its system in Montgomery.

CLARKSBURG, W. VA.—The Eureka Pipe Line Company, which was granted a telephone franchise at Clarksburg, is to construct a private system.

SMITHVILLE, W. VA.—The Ritchie County Telephone Company is extending its lines in many directions.

CAMPIA, WIS.—The lines of the Barron County Telephone Company are being extended in Campia.

EAGLE, WIS.—Lines are being built to Palestine from Eagle by the Eagle Telephone Company.

ROCK FALLS, WIS.—A telephone line from Rock Falls to Brunswick is to be constructed by Messrs. Kent Bros.

TWO RIVERS, WIS.—The Local Telephone System at Two Rivers is being rebuilt.

HYMERS, ONT., CAN.—The town of Hymers is negotiating with Port Arthur for an extension of the municipal telephone system to this place, a distance of about nineteen miles. Address George Hymers, mayor.

INGERSOLL, ONT., CAN.—Construction work on the system of the Ingersoll Telephone Company will soon be commenced.

JORDAN STATION, ONT., CAN.—A new line is to be constructed by the Independent Telephone Company at Jordan Station.

UNDERGROUND.

PETERSBURG, ILL.—The Menard County Telephone Company is placing its wires underground in the business district of Petersburg.

BUFFALO, N. Y.—The question of the advisability of placing all wires underground has been brought up before the Aldermanic Committee on Streets in Buffalo.

NEW CASTLE, PA.—The Union Telephone Company is soon to commence its underground work at New Castle.

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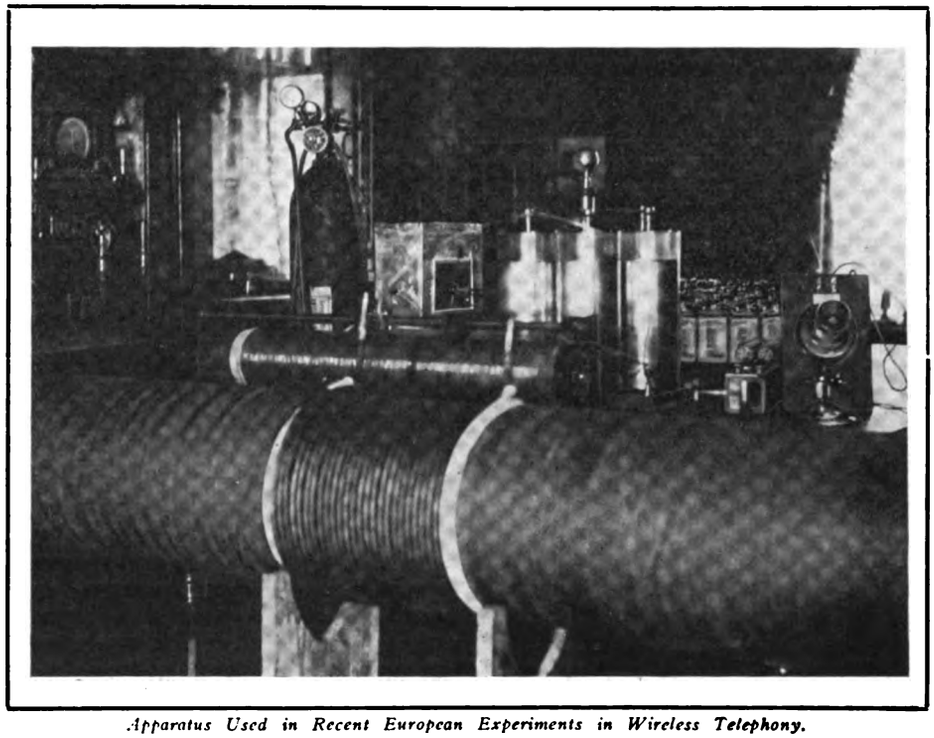
Wireless Telephony by Means of Electric Waves

By Dr. Alfred Gradenwitz.

THE problem of transmitting the human voice to a distance through the agency of electric waves, without any material connection between the transmitting and sending stations, has been discussed from time to time ever since the advent of wireless telegraphy, but no practical results had until a short time ago been obtained in that line. Only after successful endeavors had been made quite recently to considerably increase the frequency of what is called a "singing" or "speaking" electric arc, by placing the latter in an atmosphere of hydrogen (as suggested by Poulsen) or cooling the electrodes of the arc and thus advancing into the range of electric oscillations, has the problem of electrical wave telephony found what is likely to be a practical solution. In fact, the possibility of producing undamped electric vibrations, as in the above experiments, is a fundamental condition of any wireless telephony dependent on electric waves. If such electric vibrations of constant amplitude are influenced in some manner corresponding to the language to be transmitted, the latter will be reproduced at the receiving station, a telephone membrane being actuated by the electric waves sent out from the starting point with the characteristic modifications corresponding to the sound waves. The above principle is thus identical with the principle used in optical wireless telephony, but for the substitution of the far more rapid light waves as carriers of languages.



Apparatus Used in Recent European Experiments in Wireless Telephony.

The sending apparatus used in electrical wave telephony is based on a vibratory circuit permanently traversed by undamped electric waves. For giving out electric waves, this apparatus is coupled in exactly the same way as in wireless telegraphy with a tuned open vibratory system in the shape of a steel wire antenna.

Now, there are two possibilities of acting on electric vibrations through the agency of language, according as either their intensity is influenced in a manner corresponding to the voice without any variation in frequency, or else the characteristic vibration of the closed or open vibratory systems, and accordingly the accuracy of tuning of the coupled system is altered. In both cases electric waves undulating in accurate agreement with the sound waves will be produced, their frequency being either constant or variable. At the receiving station a wave detector, sensitive to oscillations in intensity, arranged in series with a telephone and battery, will be used in a way quite analogous to electrical space telegraphy. In the case of constant wave lengths an alteration in the intensity of the waves will result in a corresponding alteration in the effect exerted on the receiver, while with variable wave lengths a variable number of waves will, during the same intervals of time, act on the receiver, the effect on which thus depends on the number of arriving waves of constant intensity.

Mr. E. Ruhmer, of Berlin, whose experiments on optical wireless telephony will be remembered, has just succeeded in obtaining a practical solution of the above problem, the results of which he communicated to the International Conference on Wireless Telegraphy, which is being held at Berlin.

A sending apparatus arranged according to Poulsen was used, comprising a "singing" arc lamp arranged in a hydrogen atmosphere and being fed with direct current at 220 volts. The vibratory circuit was constituted by a capacity consisting of seven Leyden jars of about 0.02 M. F. capacity, an adjustable self-induction coil and the primary coil of a Tesla transformer. In the case of a convenient tuning a high-tension flaming arc several centimeters in length, could be maintained quietly burning between the secondary terminals of the Tesla transformer.

On examining this electric arc in a rotating mirror, it was found to present the appearance of a continuous-current arc, its frequency (about 300,000 per second) being far too high to decompose it into individual spark discharges. An oscillograph glow tube, inserted in the secondary of the transformer (and which, by the way, affords an excellent means of tuning the vibratory circuits to each other) likewise shows in the rotating mirror a uniform glowing surface, limited by two straight lines parallel to the line of zero and lying at the same distance from the latter.

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This oscillograph glow tube also permits the influence exerted on the intensity of the undamped electric oscillations by the distance of the electrodes of the wave generator, as well as by the intensity of the feeding current, to be recognized by the defiction of the glow. This observation induced Mr. Ruhmer to alter

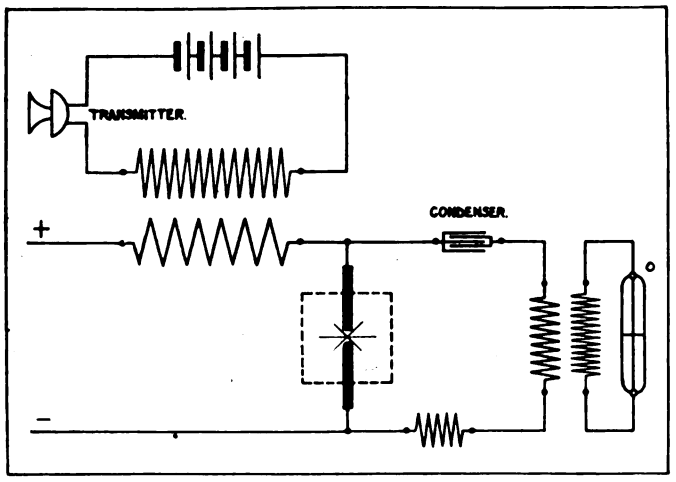

Fig. 1. Connections of sending apparatus used by Ruhmer in wireless telephone experiments.

the generator of waves in the same way as a "speaking" arc lamp. The throttling coil so far inserted in the feeding circuit of the arc and which was intended to prevent any reaction of the rapid oscillations on the direct current circuit, was replaced by an induction coil the secondary winding of which was connected to a transmitter and battery (Fig. 1). This experiment proved successful as on talking into the transmitter the oscillograph tube distinctly showed a glowing band of variable luminous intensity with indentations corresponding to the sound waves, showing the intensity of the high frequency currents in the secondary coils of the Tesla transformer to be influenced in a manner corresponding to the spoken words. While being unable to decide which of the two processes above referred to has been realized in the present case, Mr. Ruhmer is inclined to suppose the existence of a composite effect, depending on an alteration both in the wave length and intensity of the electric oscillations. Whenever in the place of the glow tube, the flaming arc was fed with the undulating high frequency currents, this would render clearly and distinctly any word spoken into the microphone, in fact with

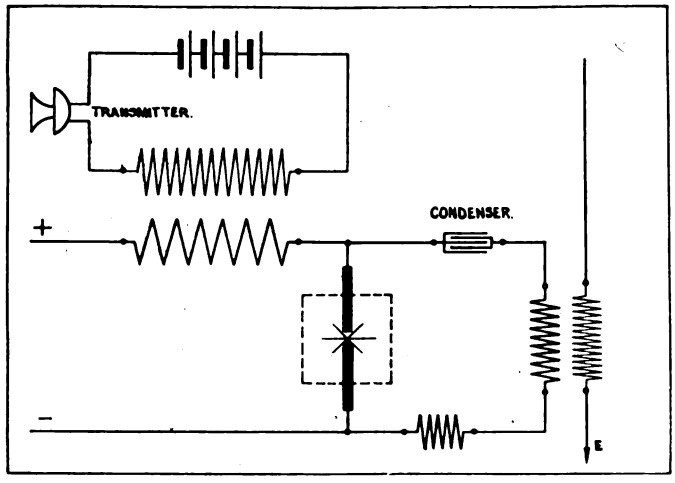

Fig. 2. Sending apparatus used in Ruhmer's experiments for the actual transmission of speech.

an intensity exceeding that of the familiar direct-current "speaking" arc.

After these successful preliminary trials, there was not much left to be done before language could be transmitted by the same process with the aid of electric waves. The arrangement used to this effect is represented in Figs. 1, 2 and 3. After using a microphone contact as a wave detector, Ruhmer eventually replaced this by an electrolytic cell, which proved more efficient.

The experiments so far made, while being confined to the inventor's laboratory, gave surprisingly favorable results, spoken words being transmitted, with the aid of an aerial 1½ meters in length, to the available distance of 30 meters. Mr. Ruhmer is actively engaged in continuing these interesting experiments and confidently hopes by his method to bridge distances of several kilometers, provided aerials of sufficient length be employed.

OFFICIAL BULLETIN NUMBER FIVE OF THE INTERNATIONAL INDEPENDENT TELEPHONE ASSOCIATION OF AMERICA.

SECOND SERIES.

CONVENTION PROCEEDINGS:

The official report of the June convention is ready. This is in the form of a handsome 248 page 6" x 9" book. It contains verbatim reports of the convention proceedings and speeches at the banquet, all of the papers read, complete reports of committees, as well as a list of all attending the convention, etc., etc. Important facts and data are tabulated by states for easy reference. The report is a valuable handbook of information, a complete and authentic history of the greatest telephone convention ever held.

INDEPENDENT PROGRESS:

A syndicate of well known active Independent operators, who have already done much in developing the industry, have secured

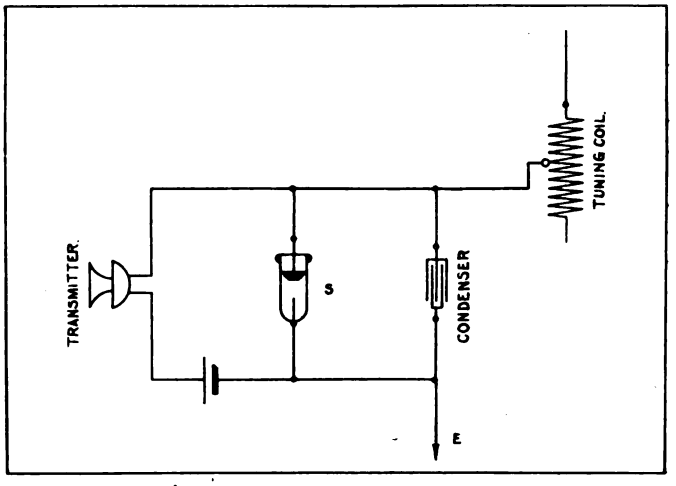

Fig. 3. Receiving apparatus, with electrolytic cell wave detector.

control of the franchise and all telephone rights of the Illinois Tunnel Company, and are completing their arrangements for installing a first-class up to-date absolutely Independent telephone exchange in Chicago, and furnishing good long distance connections with that city. The men in charge of this project have plenty of money at their disposal to carry it through, and will be entirely free and unhampered by any influence in developing the city for the Independents. The city government of Chicago has been satisfied as to the genuineness of their purposes, and active work will commence in the near future. At last the citizens of Chicago are to find relief from the oppression of the telephone monopoly, and the Independent interests of the country are no longer to be denied an entrance to that city.

November 6th at the regular election, the citizens of Omaha, Nebraska, ratified an Independent franchise. The victory marks the close of as fierce a fight as has ever been waged by the Bell company against the entrance of competition, and will be of incalculable benefit in strengthening the Independent movement throughout Nebraska and the Middle West.

The City Council of Milwaukee passed an Independent franchise by a vote of 45 to 1, the ordinance being promptly signed by the Mayor. The Independent victory there records the loss of another Bell stronghold.

(*Continued on page* 354.)

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A Coil for Renewing the Strength of Magnets

By Ray H. Manson.

PERMANENT magnets of telephone generators and polarized ringers actually do, from various causes, lose a portion of their magnetism or in some cases a complete demagnetization is effected. It is needless to say that manufacturers of this type of equipment have made most careful studies of this subject, and while it is possible to use special magnet steel and to "age" the magnets so that under average conditions they will hold their magnetism practically indefinitely there is still a chance for a further loss of magnetism. For example, a generator when new will give a certain output due to its strong magnets. If this generator is operated on a short circuit for any length of time the armature reaction will establish lines of force opposing those of the permanent magnets and of sufficient magnitude to greatly weaken them. It is easy to see that on heavily loaded bridging telephone lines a similar action might in time greatly weaken the generators.

Another and not uncommon way in which generator magnets are de-magnetized is through a discharge or leakage of direct current through the generator armature winding. This is only possible when the generators are not provided with a shunt. The permanent magnet of a polarized ringer is not usually affected by the passage of current through the windings, as when correctly designed it occupies a neutral position in respect to the magnetic circuit of the coils. In addition to the losses resulting from the action of electric currents a partial de-magnetization of

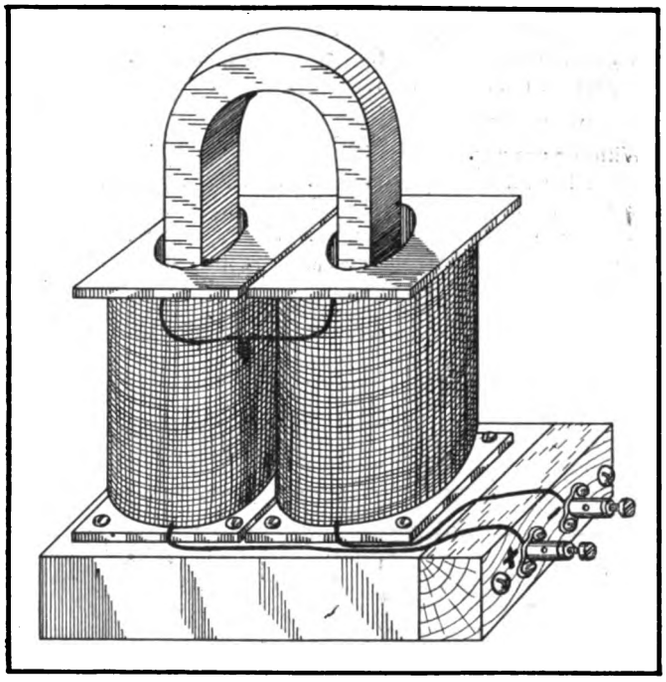

Fig. 1. Perspective view of finished magnetizing coil, with generator magnet inserted.

any magnet can result from mechanical shocks, so that even with the best construction it must be assumed that, when a big factor of safety in operation is not provided, there will be in time a necessity for re-magnetizing.

Polarized ringers for regular exchange work have a sufficiently large factor of safety, but on bridging lines where the circuits are generally loaded until the limit of signalling is reached there is no margin left and a very slight weakening of the permanent magnets of the generators will immediately become known. As previously mentioned, the reaction in a generator under such conditions has a tendency to cause this weakening, so that from this point of view the practical or limiting load on a bridging line is reached long before the signal becomes questionable.

The act of removing or replacing generator magnets, such as taking them from one generator and placing them on another, will greatly weaken them. In every case, they should be strongly magnetized before being replaced, thereby giving the generator its original large output.

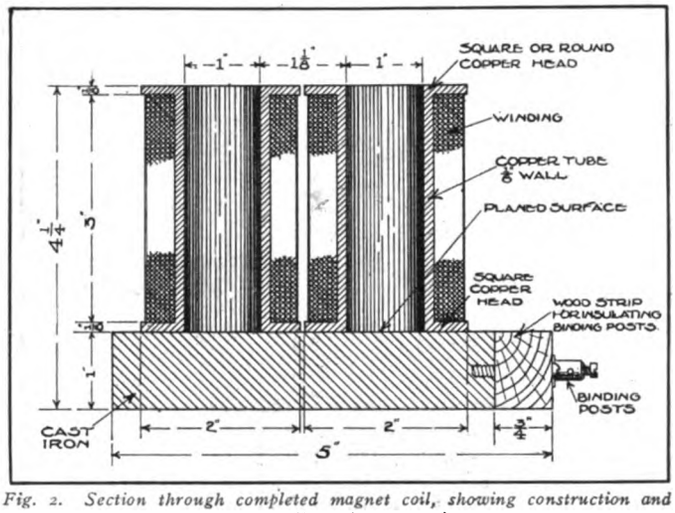

Fig. 2. Section through completed magnet coil, showing construction and dimensions.

The magnetizing of new magnets or the remagnetizing of old ones must be thoroughly done as there is considerable loss of magnetism during the process of assembling the apparatus. To prevent too great a loss, when the magnets are not immediately used as soon as magnetized, a "keeper" or armature of Norway iron is placed across the magnet poles until used.

A simple and efficient magnetizing device, one which can be readily constructed without the use of special tools, is illustrated in the accompanying drawings. Fig. 1 shows a cross section with dimensions, while Fig. 2 shows a perspective view of the magnetizer with a generator magnet inserted. It consists of a base of magnetic metal such as annealed Norway iron (cast iron or steel will do) with a finished or plane upper surface. Upon this base are mounted two solenoids, made exactly alike and with openings large enough to admit a generator magnet loosely, so that its ends will rest squarely on the surface of the base plate. In this way the coils act directly on the magnet, and the only air gaps in the magnetic circuit are those between the ends of the magnet and the base plate, the latter serving as a yoke. This not only simplifies the construction of the magnetizer, but gives a most efficient electrical arrangement.

The spools can be made from any metal or thin wood, but it is preferable to use seamless copper tubes with sheet copper heads so as to give a quicker action to the coils.

When a direct current lighting circuit of 110 or 220 volts is available the magnetizer should have each spool carefully filled with a winding of No. 32 B. & S. gauge single silk covered copper magnet wire. This winding should be done in layers and the completed coils covered with book binders' cloth for

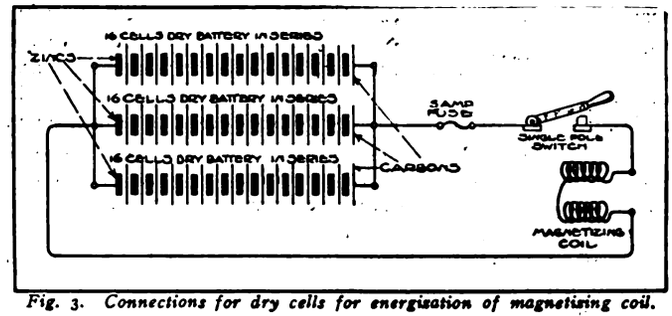

Fig. 3. Connections for dry cells for energisation of magnetising coil.

mechanical protection. Before winding the spools should be carefully insulated with heavy paper and then shellacked. A

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good paste containing no acid or other harmful ingredient should be used for fastening the paper insulation. (The paste known as "Photo" or "Photo-Library" paste will do.)

It will probably be found necessary to insert layers of paper

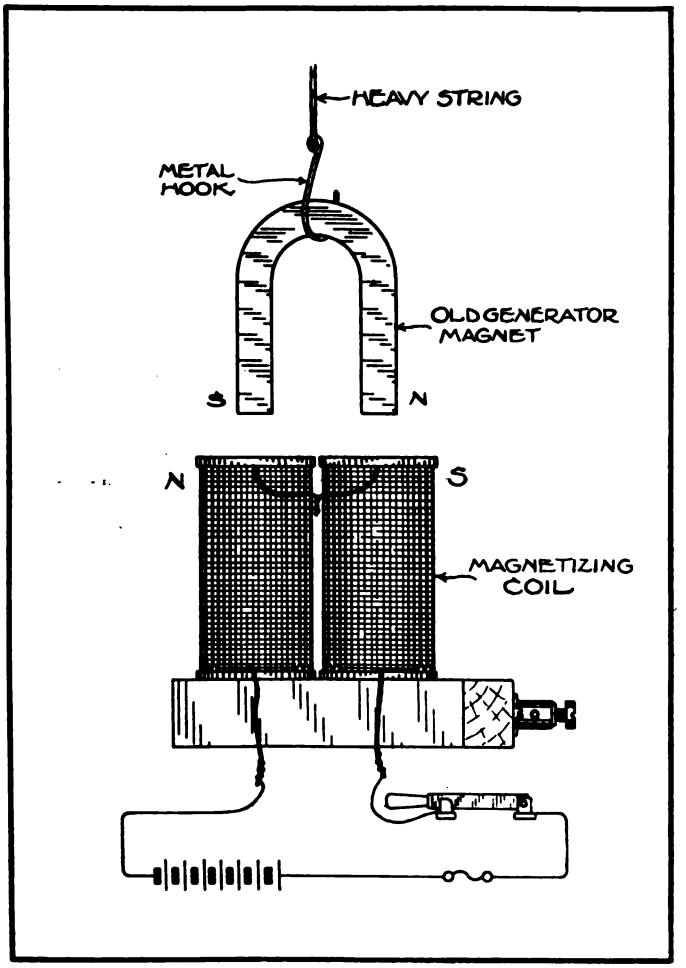

Fig. 4. Finding the holes of old generator magnet before inserting in coil by suspension above the electromagnet.

at intervals during the winding so as to cover rough layers of wire and allow the remainder of the winding to be laid on smooth. It is not advisable to put more than five or six layers of paper on each spool as valuable winding space will then be sacrificed. However, the presence of several papers between the layers will add to the insulation of the winding and for that reason is an additional advantage. The inside ends of the two windings should be connected together while the outside ends are to be attached to the insulated binding posts provided on the base plate. The two windings will then be in series so as to act together. If the connections are reversed the inserted magnet can be easily withdrawn when the current is flowing.

If no lighting circuit is available for furnishing current for the magnetizers, very good results can be accomplished by using dry cells or other primary battery connected so as to give approximately 24 volts. As each dry cell when new gives one and one half volts, there should be at least sixteen connected in series, or if the cells are small, two or more sets of sixteen in series should be connected in multiple as shown in Fig. 3. For this low voltage the magnetizer should have a winding of No. 26 B. & S. gauge single silk covered copper magnet wire.

In remagnetizing old magnets it is advisable to insert them in the solenoids in such a position as to increase the magnetism rather than to demagnetize them. The proper direction is readily ascertained by means of a small pocket compass or by suspending the magnet above the solenoid while the current is flowing as shown in Fig. 4. In the latter method the magnet will revolve so that its north pole will come over the south pole of the solenoid. It should be especially noted that it is necessary to insert the magnet in this position, so that its south pole will be in the north pole of the solenoid.

When using the magnetizer the magnet should be inserted in the solenoid before the current is connected and removed after the switch is open. A few seconds is a sufficient time to give a good magnetization, the upper or projecting portion of the magnet being rocked during this time so as to settle its poles into better contact with the base plate. These magnetizing coils can be used for re-charging ringer or receiver magnets by providing iron cores as shown in Fig. 5 for the solenoids.

OFFICIAL BULLETIN NUMBER FIVE OF THE INTERNATIONAL INDEPENDENT TELEPHONE ASSOCIATION OF AMERICA.

(Continued from page 352.)

At the last election, the voters of Denver, Colorado, also decided in favor of an Independent franchise.

These Independent victories, at points which have been so zealously guarded by the monopoly, mean much, very much to the cause. The Independents are beginning to reap the benefit of persistent concerted effort, and the value of a good organization is being practically demonstrated.

MAP DEPARTMENT:

The importance of reliable data as a means of advancing the Independent movement cannot be overestimated. Hence the work we are doing in preparing the State toll line maps should appeal to all and enlist everyone's support. If your company operates toll lines and a map of same has never been furnished this office, please consider this a personal invitation to send in your map at once—and do it now.

SHIELD ADVERTISING:

With the progress Independent telephony is making all over the country, the Shield means more than ever. Lose no opportunity to constantly display the banner under which the Independents are marching to victory. If you are not doing your full part in this important work, get in line—help educate the public to "Look for the Shield."

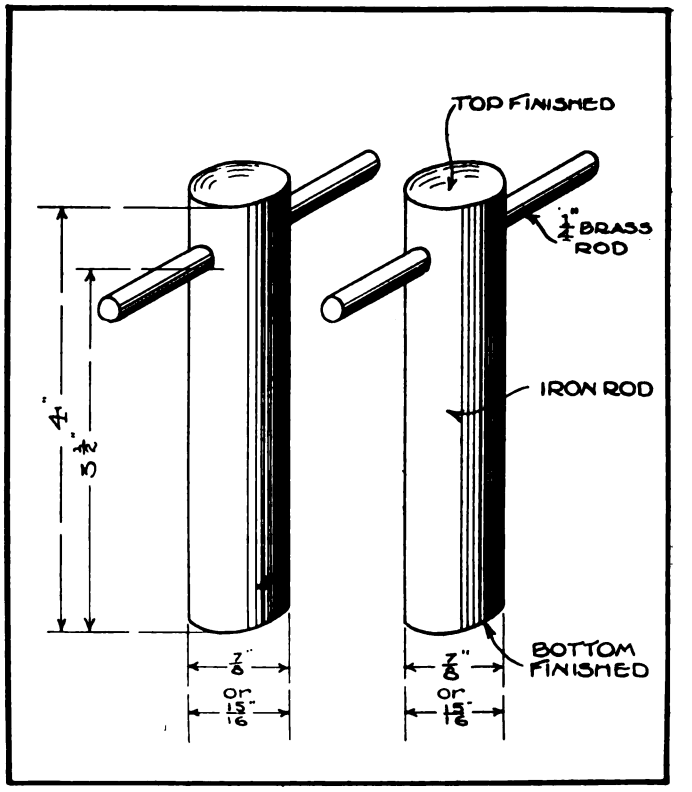

Fig. 5. Cores to insert in magnetizing coils when used for remagnetizing ringer magnets.

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Municipal Ownership of Telephones in Canada

AT Portage La Prairie the representatives of the municipalities of the Province of Manitoba listened to a very earnest discussion of telephone conditions, and passed a resolution which may have much to do with the character of the telephone system ultimately developed in the Dominion.

Mayor Dyke, of Fort William, called attention to the disadvantages which have in the past attended the service of the Bell monopoly. He said, in part:

"The present situation in Canada is almost entirely controlled by a corporation monopoly, whose charter contains enormous privileges, which in character of service, control of rates, dominant usurpation of public streets and highways, constitutes a direct menace to public rights.

"There is no doubt that out of this strong legal position, coupled with the natural avarice of capital, has grown excessive rates, poor service and arrogant methods of dealing with the people. These circumstances have produced, not only unrest in the greater portion of Canada, but an open agitation that long distance lines be owned by the government, while rural lines and urban exchanges should be owned by the municipalities.

"In the United States conditions are divided between the 'Bell' monopoly and 'Independent' companies. the latter being in the ascendant. In Canada the Bell Telephone Company has shown by the holdings of its stock and the personnel of its management that it is largely a United States organization. This company, with its monopolistic charter, and its arrogant methods, has so aroused public sentiment in the East, that upwards of seventy Independent companies, with over 12,000 subscribers, have been formed to resist their aggression. In this western land there are a few Independent companies, but we believe that the ideal condition now sought is to have government ownership of long distance systems and municipal ownership of rural lines and urban exchanges."

"Municipal ownership in telephones on this continent is confined to Canada; and in Canada the area as yet is confined to the newer portions of this great West. Fort William, Port Arthur, Kenora, Neepawa and Edmonton are the only cities as yet to undertake this work. The cities of Fort William and Port Arthur installed their systems in 1902, each city owning and operating its plant with a free exchange of connections between subscribers in each place. The following statement of Fort William and Port Arthur shows their development to date:

STATEMENT SHOWING RECEIPTS AND EXPENDITURES OF FORT WILLIAM SYSTEM.

1903—	
Expenditures	$3,608.17
Earnings	3,031.12
Deficit	$ 576.92
1904—	
Earnings	$5,424.13
Expenditures (including deficit 1903)	4,929.15
Profit	$ 494.98
1905—	
Earnings	$9,792.00
Expenditures	7,091.49
Profit, 1905	$2,700.51
Profit, 1904	494.98
Total profit	$3,195.49
1906—	
Earnings to Sept. 29	$7,325.93
Expenditures to Sept. 29	6,472.29
Profit, 1906	$ 853.72
Profit, 1904 and 1905	3,195.49
Total profit to date	$4,049.21

Number of telephones, 850; total amount expended on capital account, $53,792.31.

"The new exchange is now ready, and will accommodate an ultimate capacity of 4,800 lines. A new exchange building is erected in West Fort William, capable of accommodating 500 subscribers' lines.

"The following shows the growth of the Port Arthur telephone system:

	Number of Subscribers.	Extra Services.
Jan. 1, 1903	200	—
Jan. 1, 1904	321	24
Jan. 1, 1905	633	61
Nov., 1906	707*	70

"The new central office telephone equipment will consist of a central energy switchboard, having an equipment for the immediate operation of 1,200 lines, with a multiple capacity for the ultimate accommodation of 4,800 lines.

Mr. Dyke cited letters from the mayors of the cities of Calgary, Ottawa and Toronto, all expressing the opinion that the present difficulties would be removed by municipal ownership. In conclusion he made the following significant statement:

"If in twenty-eight years the Bell Telephone Company, after paying handsome dividends on its inflated stock, can pile up a reserve of nearly $3,000,000, then it is reasonable to suppose that if the principles of the legislation of the Manitoba government are faithfully applied, not only in Manitoba, but in that area stretching from Fort William and Port Arthur to the Pacific Ocean, then the citizens residing in this area, in addition to having the very best telephone equipment and service which money and skill can produce, will also have saved to their pockets during the next twenty-five years a sum not less than three millions of dollars."

Following this address, Mr. Francis Dagger, well known to all telephone men of Canada and the United States alike, spoke in part as follows:

"The 'Bell' monopoly, now known as the American Telephone and Telegraph Company, which controls all companies classed as its sub-licensees, including the Bell Telephone Company of Canada, was organized prior to 1880 to operate the telephone patents of "Bell" and "Edison." I would call your attention to the fact that a patent is granted an inventor in order to afford him protection for a limited number of years, during which period he is at liberty to handle it commercially in such a manner as will enable him to reap an adequate compensation for his genius. At the expiration of the term for which the patent is granted, an inventor has no longer any specific claim for such compensation, his invention becoming common property of the commercial world.

"The 'Bell' monopoly was afforded that protection until the expiration of the patents in 1893. Thirteen years have passed and yet we find in places where there is no competition the "Bell" companies still exact from the people charges which the competition of Independent companies prove conclusively to be unreasonably high.

"This is particularly true in the province of Manitoba, and the conditions here have been aggravated by the fact, that, prior to the opening of the parliamentary telephone enquiry in Ottawa last year the development of the service outside of Winnipeg had been almost entirely neglected.

"From a return made by the company to the Dominion telephone committee we find that on January 1, 1905, in the city of Winnipeg there were 4,121 telephones and in the remaining twenty towns in which the company operated only 1,411, as a result of twenty-five years' operation. Further than this, it is doubtful if out of this number any telephones were installed in the homes of the 40,000 farmers settled in the province at that time. At the Dominion

*Seventy-five additional subscribers have signed contracts and are now awaiting the installation of the new switchboard.

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telephone enquiry the company admitted that it was only supplying service to 2,000 farmers in the whole of the territory in which the company operated, comprising Quebec, Ontario, Manitoba and the Northwest territories, or an average of one telephone to each 1,250 of the rural inhabitants.

"During the twelve months ending last September, half as many new telephones were installed by systems entirely outside of "Bell" influence or control, the majority of the farmers, as that big corporation with all its powerful organization installed over the whole of its territory, including the natural growth of business in the large cities of Canada."

After relating figures showing that service could be obtained for less than the charges of the Bell company, and referring to statements from that organization in opposition to the general trend of thought Mr. Dagger said:

"It is not a matter of surprise that the supporters of the monopoly should adopt the subterfuge of professing so much tender solicitude for the poor ratepayers of this province. The anxiety showered upon the ratepayers is, however, as nothing compared with the desire of the monopoly to retain the privilege of fleecing the ratepayers to its own advantage."

Referring by way of explanation to the primary cause of the discussion Mr. Dagger said:

"'The legislation, as enacted in Chapter 89, provides that the provincial government shall build and operate the long distance telephone service throughout Manitoba, and further, that upon the request of the municipal council it shall construct and operate a local telephone system in the cities of Winnipeg, Brandon and Portage la Prairie, each of such local systems to be self-supporting and under no circumstances to become a charge upon the ratepayers of other municipalities. Further than this, it is provided that in order to place the control of the government telephone service beyond the influence of politics, a commission of not more than three commissioners, one of whom shall be a qualified engineer, shall be placed in absolute charge of the telephone system constructed by the government.

"The construction of these long distance lines will require the expenditure of a large sum of money, and before proceeding to carry out this work the government very wisely seeks to ascertain to what extent the provision of these long distance lines will be appreciated by the people, and whether the majority of the municipalities are prepared in the near future to construct local exchanges to connect with and thus furnish revenue for those lines.

"The act therefore provides that the duly qualified ratepayers shall at the next municipal election answer this simple question: "Shall this municipality own and operate its own telephone?"

The Hon. J. B. Ware, who was present for the purpose of aiding the members with his knowledge gained during a long period of successful competition with the Bell company in the United States, presented facts and figures to show that the Canadian Bell organization is in fact and beyond a doubt a part of the general telephone monopoly which has its headquarters in Boston, and that the Canadian company is in all probability subject to direct control from that city. Thus all the features of the competition of the Independent companies in the United States should be especially interesting to the Canadians who are about to undertake such a competition with the same organization. Mr. Ware gave an interesting table, showing the present comparative standing of the Citizens' Telephone Company of Grand Rapids, Mich., and the Bell company in Grand Rapids and the surrounding territory as follows:

City or Town.	Population.	Citizens.	Bell.
Grand Rapids	105,000	8,000	3,400
Lansing	18,500	1,900	1,400
Muskegon	21,000	1,300	*400
Traverse City	10,000	1,400	400
Cadillac	9,000	1,011	*300
Holland	8,000	883	82
Ionia	5,300	710	500
Greenville	3,300	602	25
Belding	3,300	422	6
Lowell	1,800	400	6
Nashville	1,160	311	5
Middleville	900	304	2
Rockford	700	302	10
Saranac	700	220	2
Vermontville	700	406	2

Mr. Ware spoke of the almost uniform success of Independent companies, and called attention to the rapidity of development under their influence. With regard to rates he said:

"While there may be exceptions, I judge that it is the rule for the Canadian Bell to charge for village service at least $18 for residences, where in the United States the same, as a rule, can be secured at $12 from local companies and usually from Bell companies where competition exists; and to charge for business telephones about $24 or more where the same service costs $20 or less with us.

"I found at Dauphin 90 Bell telephones, with rates of $18 for residences and $24 for business. In Michigan $12 is the usual rate for both business and residence telephones in small towns."

With regard to the long distance lines, Mr. Ware said:

"In conclusion, I wish briefly to consider the long distance branch of the business. Originally, in the United States, the Bell company charged one cent per mile for long distance service. Later, and if I remember aright, about the time that the Independent movement began, the basis was reduced to ¾c. per mile for three minutes' conversation, being 75c. for 100 miles. The Independent companies in Ohio, Indiana and certain other States, have adopted 6 mills (6-10 of a cent) for three minutes' conversation, being 60c. per 100 miles. In Michigan the Independent companies have adopted 5 mills, or ½c. per mile for three minutes, being 50c. per 100 miles, and there are many instances where less rates are charged. It will be of interest to you, and I trust a striking object lesson, when I inform you that the long distance lines of the Independent companies in Michigan are earning, over and above the cost of operation and maintenance, from 12 to 25 per cent upon the investment."

Mr. C. B. Cheadle, secretary of the Illinois State Independent Telephone Association, in an extremely able address outlined numerous well known and characteristic policies of the Bell company which seem to make it necessary to establish a competing system. He presented figures showing the beneficial effects of competition in many cities in the United States, and gave statistics showing what costs might be expected in the construction of such systems as would be suitable for the municipalities.

The Hon. Colin Campbell outlined the policy of the legislature, and made it clear that all assistance would be given the municipalities if they will undertake the work of local building.

There was much discussion of an exceedingly interesting character during the second day devoted to consideration of telephone matters. A resolution was passed embodying the sentiments of the convention, which may be summed up in the following abstract from the resolution:

"This convention hereby resolves that we reaffirm our former declaration that the telephone is a public utility and as such should not be left in the possession or ownership or under the control or operation of a private individual or corporation in whole or in part, but that the ownership, control and operation of the same should be undertaken by some body or bodies representative of the people, responsible to the people and in trust for the people; that therefore we recommend to all municipal electors to vote yes in answer to the question to be submitted on the telephone matter at the coming municipal elections; that as the Dominion parliament will not take over the telephones and operate them for the benefit of the people of Canada therein that parliament should grant to such of the provinces as are willing to introduce a public owned telephone system power to expropriate on a fair valuation all existing telephone systems operating under the Dominion charter, and we declare that the provincial governments should under such circumstances insist on such power of expropriation being given them."

———

* Free.

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IN THE OPERATING FIELD

RAPID GROWTH OF INDEPENDENT COMPANY AT SCHENECTADY TO BE FOLLOWED BY EXTENSIVE IMPROVEMENTS.

DURING the past three months new telephones have been added to the subscription list of the Schenectady Home Telephone Company, Schenectady, N. Y., at the rate of nearly one hundred per month. The company is offering a very satisfactory service to its subscribers, and expects thus that the growth will continue for a considerable time to come at the same rate or better.

In order to make provision for handling the business which is coming to it so rapidly, the company intends to add over 45,000 feet of cable to its system. The order for this has already been placed. Changes in the existing equipment will also be made, in order that a four party selective service may be installed. As soon as these improvements have been made there is little doubt that the company will have an extremely efficient plant, and one capable of handling the new instruments with ease, owing to the added facilities for the distribution of its wires.

LIVES OF FAMILY IN BURNING HOUSE SAVED BY TELEPHONE.

HAD it not been for the telephone it is probable that one or more lives would have been lost in a fire at the residence of Henry Lorenz, near Newark, O., on the night of November 5th. A neighbor happened to see the fire about midnight, and, supposing it was a barn on the Lorenz farm, telephoned to the house. The family made their escape in time, the ringing of the telephone arousing the sleeping members in the upper story.

NOVEL METHOD OF EXCITING PUBLIC INTEREST DEVISED BY TELEPHONE COMPANY AT PEKIN, ILL.

PRIZES to be given to the persons who come the nearest to guessing the number of telephone calls handled by operators at the Pekin exchange of the Citizens' Telephone Company have been offered by the general manager, George H. Glass. The contest is limited to the business handled from 6:00 A. M. to 6:00 P. M. on two successive days. The first prize is $5.00, and the one who gets the nearest to the winning figure will receive $2.50.

The contest is absolutely free and open to every person in the city and county. The company gives out the number of calls on December 15, 1905, which was 12,360, between the hours of 6:00 A. M. and 6:00 P. M., as a guide to those interested, but calls attention to the fact that there are over 200 more telephones than last year. Popular interest in the contest is said to be very keen, and the attention of many people who have not been regular users of the telephone has been attracted to the company.

REDUCTION OF RATES AT ASHEVILLE, NORTH CAROLINA.

THE Board of Aldermen at Asheville, North Carolina, has passed a resolution reducing the telephone rates of the Asheville Telephone Company from $40 to $24 per annum for business houses, and from $24 to $16 per annum for residences. The reduction would average $11 per telephone, or about $14,000 per year decrease from the company's revenue. Following the passage of the resolution, an injunction was issued restraining the city from reducing rates as proposed. The order was applied for by the Rhode Island Hospital Trust Company which holds $30,000 bonds from the company, and which alleges that a reduction of rates would result in a reduction of its security. Until final hearing, the company is restrained from collecting rentals unless it executes a bond for $30,000 to cover any losses for overcharge.

EXCELLENT FINANCIAL SHOWING IN REPORT OF INDIANA INDEPENDENT COMPANY.

AT the annual meeting of stockholders of the Decatur County Independent Telephone Company, of Greensburg, Ind., the financial statement of the company for the year ending September 30, 1906, was read by the secretary, George H. Dunn, and the showing made was highly satisfactory to all present. The statement shows receipts and disbursements as follows:

RECEIPTS.

Rent account	$19,154.74
Toll account	1,196.60
Merchandise	54.26
Profit and loss	10.85
Total	$20,416.45

DISBURSEMENTS.

Maintenance	$2,102.18
Expenses	4,700.37
Operator's wages	4,671.05
Interest	1,970.07
Insurance	93.75
Taxes	910.20
Total	$14,448.62

The net earnings of the company for the year as shown by this report were $5,968.43. A further and a detailed report of Secretary Dunn showed that the company had a bonded indebtedness on hand of $22,000, and that the company owed a temporary loan of $12,000—making a total of $34,000. The present standing of the company is indicated by the following statement:

Company resources	$89,530.27
Liabilities	64,000.00
Surplus fund	$25,530.27

A recommendation from the directors was to the effect that rentals of stockholders be increased to meet the fixed expenses of the company and to wipe out the floating debt. After discussion it was decided to increase the rate to the stockholders from eighty cents to one dollar for residence service; offices from eighty cents to $1.25; and for business houses from $1.50 to $1.75.

The rate for non-stockholders having office telephones will be raised from $1.25 to $1.50, while other rates will remain as at present.

The board of directors includes the following well known men of the county: Morgan L. Miers, Thomas E. Davidson, W. B. Pleak, S. L. Jackson, Noah Dashiell, J. H. Christian and C. P. Miller.

The officers are C. P. Miller, president; Morgan L. Miers, vice-president; Thomas E. Davidson, secretary; J. H. Christian, treasurer.

MUNICIPAL REGULATION OF RATES AT LOUISVILLE, KY., DELAYED.

AT Louisville, Ky., the United States Circuit Court has granted a temporary restraining order, prohibiting the city from carrying into effect new telephone rates in accordance with an ordinance signed by the Mayor November 12th. The ordinance made business rates $4 a month and residence rates from $2 to $3 a month, and was to take effect immediately. The Cumberland Telephone & Telegraph Company sued out the restraining order.

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THE EDITOR'S PAGE

THE TRIMMING OF SHADE TREES.

IN an address delivered before members of the Union of Canadian Municipalities, D. P. Penhallow, Professor of Botany at McGill University, dwelt in a very interesting and instructive manner upon the value of shade trees to a city. He cited their influence in the purification of air, the advantage to men and animals alike of their shade in hot weather, and the not-to-be neglected pleasure which may be gained from regarding them as ornaments to the streets. Telephone men will be especially interested in the following abstract:

"Since the introduction of telegraph, telephone and electric lighting wires throughout all the thoroughfares of our cities, shade trees have ceased to have any recognized status. A tree which has developed a fine form through the growth of half a century is suddenly deprived of its top or other essential parts and left a maimed and shattered wreck whose mutilated stumps of former members reach up their ragged ends is if in mute appeal for vengeance upon the vandals who have been guilty of such an outrage. The case is somewhat aggravated when an enterprising citizen plants a fine tree, perhaps at considerable expense, and watches with fondest care its gradual development into an object of beauty and utility. Some day he arrives home from his office to find only a wreck of that in which he has taken so much justifiable pride and pleasure. Trees which have been dealt with in such a manner should be removed at once, for they can never become what Nature designed them to be, and their presence can not fail to exert precisely the opposite effect to that for which they were intended, because of the false standards which they illustrate."

He further goes on to give some very practical hints, in the form of a "horrible example," which if remembered may some day enable a lineman to perform a necessary piece of work as it should be done. He says that "the operations of the professional forester, or at least of the man who is paid to fill that role, are very often far from what they should be. To cut off a limb with a hatchet instead of with a good saw; to cut from above and allow the falling limb to drag a long splinter with it; to leave a projecting stump with a ragged end; or to leave limbs on the tree long after they have commenced to decay—all these things not only present a most unsightly and unprofessional piece of work, but they one and all invite the entrance of decay and ensure the certain destruction of the tree.

Consideration of these things is too frequently overlooked by telephone managers. In their haste to get lines installed and working they forget that to many of their subscribers a tree which has been trimmed to the point of ugliness serves constantly as a vexatious reminder of the faults of the telephone company. There are times when it is good business to travel slowly and even spend money for the sake of pleasing a few people.

KEEN THINKING AND RESPONSIVE ACTION.

DELIGHT in giving out the valuable results of original and productive thought is one of the characteristics of the broad-minded man. To no class of workers is this phase of human nature more evident than to the editor of a journal devoted to recording and aiding the progress of a great industry. He is in a position to observe its manifestation many times, and in many individuals, in the course of a year. Each new idea which comes to him from one inspired by this helpful motive affords keen gratification on its reception, and still greater pleasure when it may be passed on to those who will receive from it practical aid in the perfection of that knowledge which may enable them to better perform their daily work.

The putting into definite words and publication of those ideas which originate under the pressure of business necessity gives to the efforts of the individual a power which seems to bear a remarkable analogy to that expressed in a simple and well known principle of hydraulics.

If there be a small quantity of liquid confined in a little chamber separated from a larger quantity in a containing vessel by a rigidly supported partition of definite area, and a pressure is applied to the small quantity of liquid, this pressure is exerted only upon the walls of the tiny chamber. But let the partition be withdrawn and immediately the force which is applied at so small a surface is transmitted without loss through the whole body of the liquid, and may be felt in intensity equal to that at the point of its original application at any part of the retaining surface. So it is that the knowledge of the individual telephone man, gained in his own immediate work at home, may be distributed through the entire great field by which improvements are made in the transmission of the world's intelligence, and exert in each place an influence equivalent to its intrinsic worth.

The function of the publisher is not to produce knowledge in the field in which he works, but he is able to immensely enlarge the sphere of influence of that which is produced, and so to stimulate and aid progress. It will be readily seen that such progress in any given line of thought can be secured only when the distribution of one man's knowledge is followed by the telling of related facts gleaned by others which follow as a consequence. It is in the lack of such effects that the failure to achieve immediate results is felt. When a new fact is received by an alert mind it is immediately placed in a new setting furnished by a new group of experiences, and thus at once acquires a new meaning, broader than it originally had. Strange as it may seem, these elements of novelty are seldom realized by the man who provides them. They are among the things which are most often revealed to their originators only when the story is told by another. They are the countless inventions which were made time and again but come to light only after one man more alert than his fellows has secured a patent which may bring wealth or reputation. Their recognition is the first step toward advancement.

In countless files of correspondence there are contained the solutions of problems which are to-day vexing men who are confronted by conditions which seem to be new. Young men, anxious to fit themselves for the higher duties which will enable them to fill the larger positions for which there are often no satisfactory applicants find themselves handicapped by not knowing where to locate the information they seek. More experienced men have to constantly do things which are new to their experience. Ignorant of the records which would in a moment set them upon the right track, they perform difficult tasks, and overcome their obstacles. Having surmounted them they would gladly and cheerfully give their aid to all who ask it, yet are diffident in telling their achievements if not urged. It is a false modesty, or a false estimate of the pressure of time and events which produces this attitude. Credit is bestowed in greatest measure upon the volunteer. It is the originator who recognizes the novelty of his creation and of his own motion bestows its benefits upon his associates who reaps their praise and gains success in their estimation and his own.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

INCREASING CAPITAL STOCK.

Please state in the Journal what is the mode of procedure and what items and facts, if any, must be stated when a telephone company wishes to increase the amount of its capital stock. This is, of course, for the State of New York. R. A. B.

AN increase of the capital stock is made by amending the charter, and in New York the statutory procedure varies with the nature of the amendment. A duly called meeting of the stockholders must be held at which a two-thirds majority of the stock must vote in favor of the proposed increase. The amendment, duly certified, must then be filed in the office of the Secretary of State with the same formalities as the original paper. It would not be safe to take so important a step as making an increase in capital stock without consulting your local counsel, and acting under his direction.

INJUNCTION AGAINST CITY OF NASHVILLE DISSOLVED.

AT Nashville, Tenn., the court of chancery has rendered a decree dissolving the temporary injunction recently secured by the Home Telephone & Telegraph Company, restraining the Mayor and city council from interfering with the actions of the telephone company in erecting poles within the corporate limits. The court held that the company has failed to bring proof enough to sustain its side of the case and that allegations made by the Home Company were fully answered by the city. Protected by the injunction, the telephone company has erected its line in the streets. The case will be appealed to the Supreme Court.

DOES SALE OF FARM TRANSFER INTEREST IN RURAL TELEPHONE LINE?

One of the parties on our telephone line sold his farm, and we want to know if the share in the line and his telephone would have to go with the farm, as nothing was said about it when the farm was sold. Each party on the line shared equally in building the line and it is owned jointly, but each party on the line furnished his own telephone and it is owned individually. W. E. T.

A TELEPHONE system is generally held to be real estate. American Telephone Co. v. Middleton, 80 N. Y. 408; Shelbyville Water Co. v. People, 140 Ill. 545; Badge Lumber Co. v. Light & Power Co. (Kan.) 92 P. 476. On this theory the selling of a farm without specially including the interest in the rural telephone line situated upon it would convey also the interest in the telephone line. This is particularly the case where the line is a farmer's line for which the members contributed equally, and which they owned jointly. The fact that each party owns his own instrument individually does not change the situation. This question has never been passed upon by a court of good authority and all the editor can do is express his own opinion, drawing his conclusion from general principles of law.

PRESUMPTION OF NEGLIGENCE FROM INJURY.

ONE Reeves owned a private telephone line running from his saw mill into the city of Helena, Arkansas. It was strung on trees and posts and at places in the public road was poorly constructed and usually in bad condition. Owing to a broken pole, the wire sagged over the highway and was in this condition for two days. In broad daylight a girl, fourteen years old accompanied by two grown women, drove along this road is a surrey drawn by a gentle horse. The sagging wire caught the top of the surrey, made a scraping noise, tore off the top and frightened the horse into running. One of the women was thrown out and seriously injured. She sued Reeves for damages. From a judgment for the defendant the plaintiff appealed and the judgment was reversed. The court held that the evidence of the accident and injury following therefrom, the occurrence being not out of the usual course, were prima facie evidence of negligence, and the defendant could only discharge himself by showing affirmatively that the accident was due to some cause consistent with due repair and careful management. The entire defence was that defendant's teamsters, passing the road nearly every day, were instructed to give notice of the line being out of order, and that defendant was in the habit of having the line repaired when out of order, although he was absent at the time of the accident.

On the subject of contributory negligence the court held that the travellers were not required to look up to see if the telephone wire was in reach of the top of the buggy in order to be free from negligence and also that it was not negligence to permit a girl fourteen years old when accompanied by two grown women, to drive a gentle horse along the public highway in daylight. The court also decided that it was immaterial whether the woman who was injured jumped out or was thrown out. Jacks v. Reeves (Ark.), 95 S. W. 781.

DUTY OF COMPANY TO TRESPASSER ON ITS POLE.

AN employee of the Hudson River Telephone Company was on a pole belonging to an electric railroad company. Near the top of the pole was a cross arm supporting a wire belonging to the Schenectady Illuminating Company, having inadequate insulation and carrying a current of electricity of 2,200 volts, dangerous to human life. On the pole some distance below the cross-arm was a bracket carrying a wire of the telephone company. The work of the lineman was to transfer the telephone wire belonging to his employer from its bracket to a cross-arm placed on the pole below the illuminating company's wire. For some reason not given he separated the illuminating company's wire from its cross-arm by untying it from its pin and glass insulator. Afterwards, and while engaged in retying the wire, he received from it a shock of electricity which caused his death. The administrators of the deceased brought suit against the Hudson River Telephone Company, and the Schenectady Illuminating Company. The latter demurred to the bill of complaint, alleging that it did not set forth any ground for recovery. This the court sustained, holding that the plaintiff had shown no such ground.

The reason for the decision was that the lineman was upon the pole and engaged in work on the wire either as a licensee or trespasser and that in either event the illuminating company owed him no active duty. The court also held that the facts showed that the deceased did not himself exercise reasonable precaution. Two causes of injury were alleged—one that the insulating material was inadequate, and the other that it was out of repair. As to the first, the court said that the fact is well known that wire employed for this purpose is a manufactured article bought and sold in the open market and a person who uses it may not be regarded as negligent unless it be alleged or proved that he ought to have known its inadequacy. As to the question of repair, the court said that it was a matter of common knowledge that the best insulation is at all times and under certain conditions entirely inadequate, and that the deceased must be regarded as knowing this fact. Mangan v. Hudson River Telephone Co., 100 N. Y. S. 539.

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QUERIES

TRUNKING CIRCUIT.—(797.)

In connecting from our toll lines to city lines (common battery system) we are obliged to use either a repeating coil, or a retardation coil with condensers and would like to have your opinion as to which would give the best results on long lines, iron wire, where the talking is none too good at best. You understand that we must use condenser to stop flow of battery.

G. A. B.

The repeating coil arrangement shown in diagram B, Fig. 797*a*, is generally more satisfactory than the retardation form of feed "A." There are several reasons for this superiority.

The repeating coil, as commonly constructed, is of lower resistance than the retardation coil and therefore gives a larger volume of current to the subscriber's transmitter.

The bridged retardation coil and the bridged clearing out drop offer a shunting effect on alternating voice currents which reduces transmission.

The capacity of the two condensers in the line circuit when the coil is used offers a greater opposition to the passage of voice currents than when inserted as shown in the repeating coil circuit.

These gains in efficiency are to a certain extent offset by the loss in transmission due to the transformation losses in the repeating coil. A good coil, however, has an efficiency of 97 per cent or 98 per cent, and its loss is barely perceptible to the practised ear. It is not comparable to the other losses in the retardation coil method.

Another great advantage of the repeating coil over the retardation coil arrangement lies in the complete separation of the two lines connected together from the standpoint of induction or unbalance. This is particularly a strong point in the case of an exchange having long, open wire subscribers' loops. The device of cutting in a repeating coil is frequently used to reduce the inductive disturbance on a connection between two unbalanced or leaky toll lines.

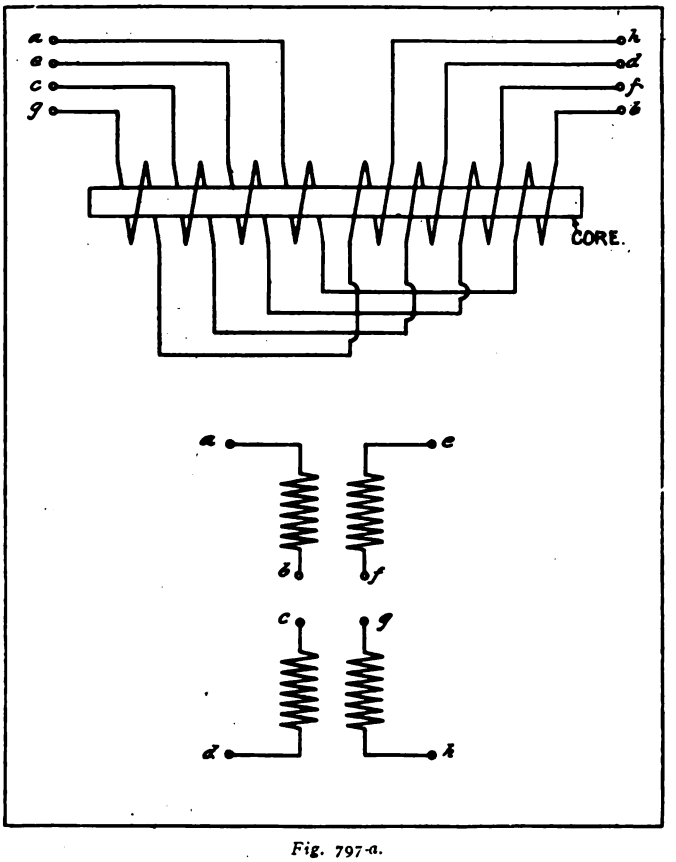

Fig. 797-a.

This effects an improvement owing to the reduction of the capacity between the individual wires of one circuit and those on the other side of the cord.

In case of the retardation coil circuit, let it be assumed that the toll line on the magneto cord is unbalanced, by exposure to a foreign source of alternating current in such a way that the induction on one wire of the circuit is greater than on the other. Also let it be supposed that at the same time there is a leak to

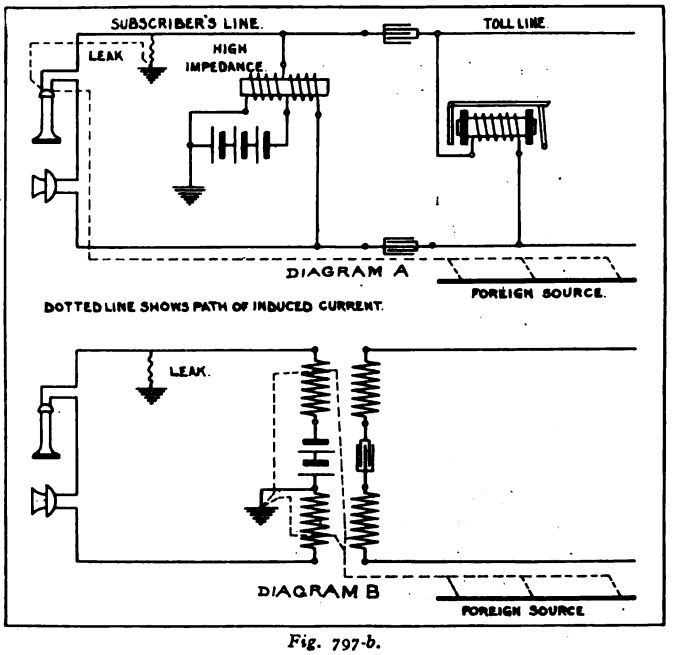

Fig. 797-b.

ground on one side of the subscriber's loop on the common battery cord. Under these conditions the induced alternating current on the one wire will pass through the condenser in that side of the circuit and will seek the ground on the subscriber's line. This will pass through the subscriber's receiver and make a noisy connection.

In the case of the repeating coil circuit the only inductive connection between the individual conductors of the two circuits lies in the capacity between the windings on the repeating coil spool. This is very slight, at worst, compared with the two microfarad condenser inserted directly in the circuit. Furthermore the best toll repeating coils are so wound that the capacity of each wire of one circuit to each of the wires of the other circuit is the same. In this way the induction upon the two wires is equal and a balance is maintained.

The figure one shows the comparison of the two arrangements for inductive effects.

Figure two shows the arrangement of repeating coil windings.

GROUNDED LINE TROUBLE.—(798.)

We have two grounded lines which at times give us a great deal of trouble from cross talk, and both drops come down when there is a ring on either line. At other times the lines are clear. They only run together for a short distance and are not transposed. Will transposing remedy the trouble?

A. N.

Transposing parallel grounded lines will not prevent cross talk between them. If your lines only run on the same poles for a short distance, however, it is not likely that you will get much cross talk between them. The conditions you describe seem to indicate a swinging cross between them. If you have testing instruments use them the next time the drops come down together or look for slack wires on poles carrying both lines.

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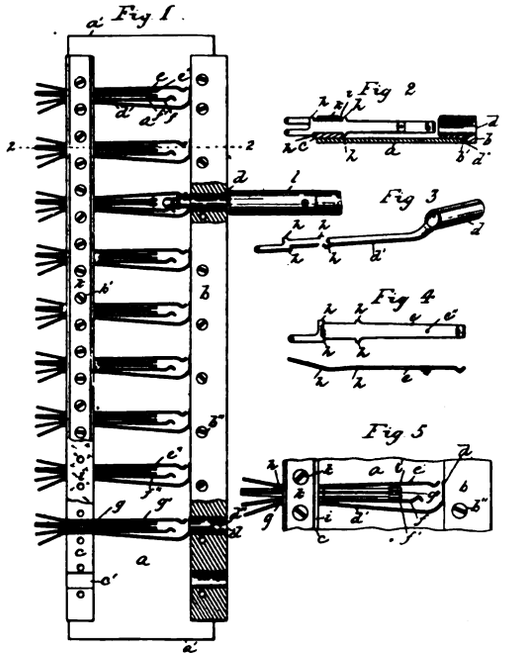
TELEPHONE PATENTS

JACK.

Charles H. North, Cleveland, O., patents (No. 836,049; dated November 13, 1906; filed October 31, 1901; serial No. 80,641) and assigns to the North Electric Company, Cleveland, O., a spring jack.

The object of this invention is to do away with certain dis-



advantages attending the use of rubber supporting strips for jacks. The main supporting plate *a* is preferably of heavy gauge sheet aluminum. At its front and rear strips *b*, *c*, of rubber or other suitable insulating material, are placed. The front strip is provided with a longitudinal shoulder b^1, against which the plate abuts, and is bored for test thimbles *d* of the jacks. In the rear strip are formed grooves with a view to receiving the assembled sets of springs. Individual springs are shaped to afford front and rear abutting shoulders *h*, which engage either side of the insulating strip *c* and a superposed mica strip *i*. These shoulders cause the longitudinal thrust exerted by the plug to be taken up by the insulating strip. The test thimbles *d* are secured in an opening in the front strip *b* by pins d^{11}. A metal strip *k* serves to seat screws k^1, which fasten the jacks in their respective grooves. Mica insulation is provided between the springs and the contact springs e^1 f^1 have associated with them stiffening insulators g^1.

COMBINED TELEPHONE-EXCHANGE AND ALARM SYSTEM.

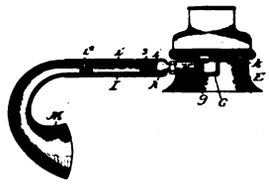
Harry G. Webster, Chicago, Ill., patents (No. 825,626; dated July 10, 1906; filed October 10, 1904; serial No. 227,876) and assigns to Milo G. Kellogg, Chicago, Ill., a combined telephone-exchange and alarm system.

In this patent the inventor describes circuits which may be used in a telephone line for the transmission of special fire, burglar and other alarm signals, without injuring the line for regular telephonic transmission. For operating his alarm signals he inserts in the line a differential relay, which in normal condition of the line is slightly energized, owing to the closure of its circuit at the sub-station through a special bridged impedance coil, the two divisions of which are of unequal ohmic resistance but of substantially equal inductance, this coil being provided with ground connection at the central point. The closure of the armature contacts of the slightly energized differential relay retains in an inactive position the indicating device at the central office. Upon the release of the make and break mechanism at the substation, controlled by a thermostatic arrangement or otherwise, the circuit of the telephone line is broken and made, causing a succession of current impulses which bring about the alternate energization and de-energization of the differential relay, producing signals according to a determined code at the central office.

HEAD TELEPHONE SET.

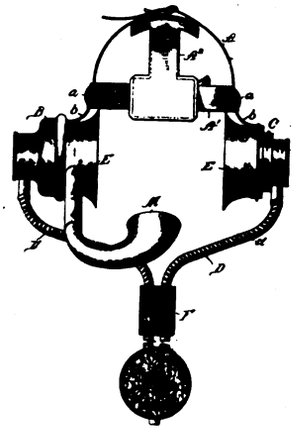
Joseph Pieringer, Jersey City, N. J., patents (No. 835,865, dated November 13, 1906; filed December 1, 1905; serial No. 289,728) and assigns to the Western Electric Company, Chicago, Ill., a head telephone set.

This invention covers a combination of a transmitter and receiver with a head harness, especially adapted to service on warships. Transmitter *B* and receiver *C* are each provided with a lug *b*, by means of which they are attached to the head harness. Binding posts, to which terminals of the cords *D* D^1 are attached,



are placed within the shells of the transmitter and receiver. Ear-caps *E E* are preferably of soft rubber, and so formed as to completely surround the ears of the user. A slip-block *F* passes over cords *D* D^1, and when tightened up draws them close to the chin of the user, thus securing the combination in place.

The mouthpiece *M* of the transmitter is made adjustable by means of a ball and socket joint *h*. The necessary friction for



holding the mouthpiece in any position to which it may be moved is supplied by the coiled spring *s*.

METALLIC POLE.

Broderick Haskell, Franklin, Pa., patents (No. 835,279; dated November 6, 1906; filed May 7, 1906; serial No. 315,566) a telegraph pole.

The inventor describes a method of building up a metallic

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pole by means of upright metallic members held together by clamping devices. The upright members are preferably U shaped in cross section. They are intended to be held together by bands formed up of a number of separate members and placed at suitable distances apart. Clips conforming respectively to the inner and outer surfaces of the upright members are intended to be attached to the uprights in pairs. The end portions of these clips are offset so as to be parallel and form an opening into which may be fitted a flat bar. Three flat bars in this way cooperate with three pairs of clips, associated with the corner members, clamping the three uprights permanently into a triangular structure. The tapering of the poles is effected by the employment of shorter connecting bars as the upper portions of the pole are reached.

TELEPHONE POLE.

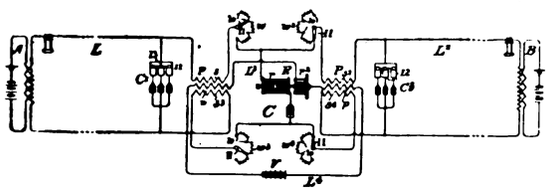
Broderick Haskel, Franklin, Pa., patents (No. 835,280; dated November 6, 1906; filed May 7, 1906; serial No. 315,567) a metallic pole.

In this patent is described a method of constructing a telephone pole, using preferably U shaped uprights of metal similar to those described in patent No. 835,279. The inventor also uses the same outer U shaped clips described in the previous patent, but in place of clips of similar form within the uprights he proposes to impart the necessary rigidity for the completed structure by the use of filler blocks, each of which is adapted to conform to the inner surface of the uprights, and be fastened to the outer clips. Connecting bars between the faces of the outer clips complete a clamping device of a substantially triangular shape.

TELEPHONE REPEATER CIRCUIT.

Herbert E. Shreeve, Newton, Mass., patents (No. 835,037; dated November 6, 1906; filed January 24, 1906; serial No. 297,630) and assigns to the American Telephone and Telegraph Company, New York, improvements in a telephone repeater circuit.

The inventor in referring to the object of the invention relates that in systems in which a telephonic relay or repeater circuit is arranged similarly to a Wheatstone bridge it is important that the electrical conditions in the main line upon the opposite sides of the relay circuit shall be substantially the same. If the impedance of the sections of the main line circuit or independent lines constituting such circuit is materially different, induced currents may flow in the bridge connection and produce a singing in the relay. Moreover, the difference in impedance tends to alter the phase of the currents in the main line sections, interfering with transmission. To balance lines of different character and dimen-



sions so that these difficulties may be overcome, the inventor proposes to insert adjustable resistances as shown at w w^3 w^5 w^4 between secondary windings s s^2 s^3 s^4 respectively of the induction coil P and the complementary end of the bridge connections.. Condensers C^3 C^4, which are of variable capacity, are to be inserted in bridge connection between the conductors of main circuit sections L and L^2. Message repeating relay R, shown for the sake of completeness, comprises a receiving element r and a transmitting element r^2, adapted to vary the current through the primary windings of the induction coil P.

SELF HEATING SOLDERING IMPLEMENT.

Theodore W. Eversole, Washington, D. C., patents (No. 835,017; dated November 6, 1906; filed October 25, 1905; serial No. 284,334) a self heating soldering implement.

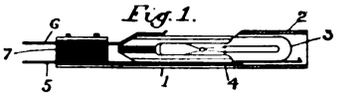
This soldering copper is of the type having a handle adapted to contain gasoline or other fuel. The rear end of this handle is provided with a screw threaded plug, through which projects the outer end of a pump barrel. A filling orifice and valve for regulating the supply of fuel to the point are set in the front of the handle. Through a tubular rod the fuel is led to a burner located immediately back of the soldering point. This burner is of a special form described in the patent, and has a flame orifice which may be controlled by a needle pointed valve supported on its rear portion.

TELEPHONE SWITCHBOARD LAMP.

Joseph Lane Wright, Washington, D. C., patents (No. 829,092, dated August 21st, 1906; filed May 10th, 1905; serial No. 259,728) and assigns to the National Engineering Corporation, Washington, D. C., a telephone switchboard lamp.

This invention covers a method of constructing a switchboard lamp so that it may be removed from the jack by any person without the use of a special tool.

Referring to the accompanying figures, it will be seen that one or both lamp contacts 8 and 9, which partially surround the bulb



3 and are insulated from each other by a block of insulating material 10, are provided with a projecting end 11, which extends along the side of the bulb 3 and slightly past its end, where it is bent into a tongue or lip. The inventor calls attention to the fact that practical tests of a lamp so equipped, and shielded in the ordinary manner by opalescent glass, have shown that the light is in no way obscured.

INSULATOR.

James F. Nicols, Plainfield, Ark., patents (No. 834,533; dated October 30, 1906; filed September 11, 1905; serial No. 277,961) and assigns one-half to C. D. Stevens, Magnolia, Kas., an insulator.

The invention described in this patent consists of two semi-cylindrical pieces of glass, provided on their flat surfaces with semi-circular grooves adapted to register and receive a wire. The cylinder formed of the two registered halves is set up vertically with the wire running through it transversely. The sections of the insulator are secured together by means of vertical pins runnining in grooves in the circumference of the glass pieces and passing through a tie plate resting on the upper end portions of the two sections.

MEANS FOR CHARGING STORAGE BATTERIES.

Talbot G. Martin, Chicago, Ill., patents (No. 834,832; dated October 30, 1906; filed February 3, 1905; serial No. 243,950) and assigns to the Automatic Electric Company, Chicago, Ill., a means for charging storage batteries.

The object of this invention is to provide an arrangement whereby storage batteries at one automatic exchange may be charged from a source of current at another automatic exchange through the medium of an ordinary trunk line. The circuit provides for the passage of a charging current while the trunk line is not in use, with automatic means for cutting off the source of charging current when it becomes desirable to use the trunk line as a medium of communication between a subscriber at one exchange and a second subscriber at the other exchange.

THERMAL PROTECTOR AND ALARM.

Frank B. Cook, Chicago, Ill., patents (No. 812,184; dated February 13, 1906; filed December 18, 1902; serial No. 135,676) a thermal protector and alarm.

In this patent the inventor describes a special method of mounting heat coils, arranged in a couple of parallel rows at each side of a grounded plate so that carbon lightning arresters may be mounted in a row along the edge of the plate. Arrangements for closing the circuit of a local alarm on the operation of the heat coil are described. Other improvements in apparatus of this type are referred to in the specifications.

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AT LIBERTY—A1 telephone man, long experience at line, instrument, switchboard and trouble. Permanent position with Independent telephone company, not less than 300 telephones. East or South preferred. State size, equipment, etc., first letter. Address S. B. Fay, Fort Smith, Arkansas. 725

WANTED—General management of telephone proposition. Able to qualify as thoroughly practical in all branches of "operating plant" and economical business management. Fully alive to "revenue" opportunities and the value of earned dividends. Will substantiate fully claims of ability and capacity by referring to present business associates and others for whom I have worked. Experience extending over fifteen years. Address Box 718, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 718

WANTED—Well educated young man, good appearance and references with some telephone experience. Write fully. Address Box 727, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 727

CABLE SPLICERS—Wanted capable splicers to work on paper telephone cables. Highest wages, $25 per week. For particulars address Box 728, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 728

WANTED—Several men with factory experience as installers on central energy switchboards. Address, Box 737, care THE AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 737

WANTED---Continued

POSITION WANTED—Young man, age 27, who has exceptional ability as telephone man and manager will be open for re-engagement January 1st. Would like management of an Independent operating company. Have twelve years' experience. Address, Box 731, care THE AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 731

WANTED—Cable splicer wants position. Good telephone man, neat workman, good at locating trouble. Underground work preferred. State terms and conditions. Address C. S., care Arthur Newton, 1342 R St., Washington, D. C. 732

WANTED—Position as trouble man. If you need a first class man in every respect, write me for particulars, best of references. Address, Box 13, Fairfax, Mo. 733

WANTED—A gentleman with large experience in engineering, constructing, maintaining, operating and managing telephone property is open for enagement at once. Address, Box 734, care THE AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 734

WANTED—Expert electrical instrument maker and designer. One experienced in telephone relays, etc., preferred. Position is in New York City. Address, stating experience and salary desired. Box 735, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 735

WANTED—Three first class linemen for line work only. Address, York Telephone Co., York, Pa. 736

WANTED—Telephone cable test man; $60. Address Box 729, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 729

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

SPACE FOR CHICAGO ELECTRICAL SHOW NEARLY ALL TAKEN.

NEARLY all of the space for the January Electrical Show of the Chicago Electrical Trades Exposition Company, aggregating about 300,000 square feet, is sold. So great has been the demand that the Coliseum annex will be used for exhibitors. Among the leading firms signing for space within the last few days are the following: Albert and J. M. Anderson Mfg. Co., Chicago; Pierce Specialty Company, Chicago; Chicago Compound Battery Co., Chicago; Eureka Electric Company, Genoa, Ill.; Bidwell Electric Company, Chicago; Beck Flaming Lamp Co., New York City; Felix Hamburger, New York City; Dean Electric Co., Elyria, Ohio; American Sewer Pipe Company, Pittsburg, Pa.; Shelby Electric Company, Shelby, Ohio, and the American Instrument Company, Philadelphia.

Managing Director Niesz sent a representative to New York last week to try and get a temporary installation of the Cahill telharmonic system in the coming show, but Dr. Cahill's representatives said that this would be a physical impossibility as there is only one telharmonium completed. This is now the beginning of the permanent installation of the New York Electric Music Company, which has commenced its service of music to clubs, hotels, cafes and residences over the New York telephone wires. Manager Pihl, of the New York company, however, agreed to attempt a long distance test of the telharmonic system by which an effort will be made to transmit music from the New York central station to the Coliseum during the exposition. This will require the co-operation of the Chicago Telephone Company and the American Telephone and Telegraph Company, which control the long distance circuit. The longest test yet made of the Cahill system was from Holyoke, Mass., to New Haven, Conn., about 100 miles. The representative of Mr. Niesz also made arrangements for the first installation west of New York of the Moore vacuum tube light.

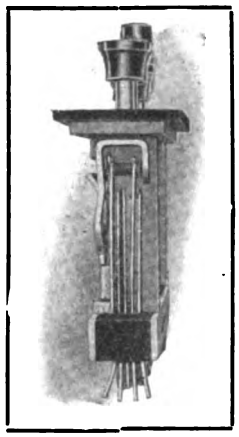

Fig. 1. End view of Dean four-party individual ringing key.

THE BLAKE SIGNAL AND MANUFACTURING COMPANY, 246 Summer street, Boston, Mass., is about to push vigorously the sales of what was formerly called the Climax Soldering Flux Tube. It will be recalled that a detailed description of this very useful device was published in the issue of THE AMERICAN TELEPHONE JOURNAL dated February 10, 1906, and that it was then sold by the Climax Manufacturing Company, of Boston. The patent rights, good will, etc., have been recently purchased by the Blake company, and henceforth the article will be known under the name of the Blake Tube Flux. The quality of the tube has been somewhat improved, and the company expects that it will be received by telephone companies as a fit associate for its other specialty products, the Blake Insulated Staples and Blake Compressed Cleats. The company is now prepared to fill all orders for the Blake Tube Flux very promptly, and will be pleased to hear from interested persons.

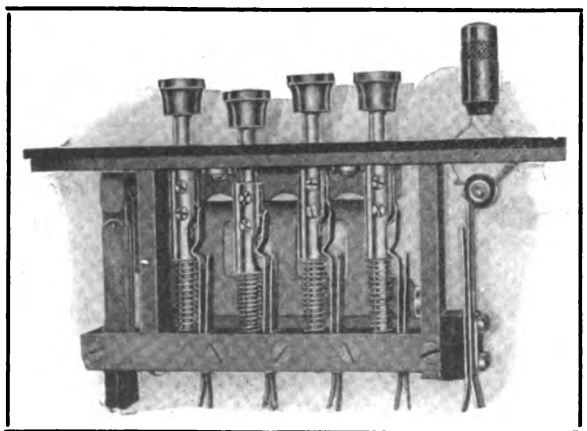

Fig. 2. Side view of Dean four-party key.

FRANK B. COOK, Chicago, Ill., has recently received many orders for complete outside equipment, or pole cable terminals, for various exchanges, as well as a large number of orders for distributing frames and switchboard protectors, including his Types Nos. 8, 10 and 14. Mr. Cook has also been kept busy turning out his Type B-4, Type B-5 and Type B-6 protectors for telephone instruments.

A few of the largest orders he has received for these various types of apparatus follow; the majority of them are for the complete equipment: La Compagnie de Telephone de Bellechasse, Levis, P. Q., complete terminal equipment for Rimouski, P. Q., Canada; Marion and Northern Telephone Company, Clintonville, Wis.; Ohio and Mississippi Valey Telephone Company, for its exchange at Anna, Ill.; also for the exchange at Carbondale, Ill.; Farmington Telephone Company, Farmington, Mo.; Tazewell County Telephone Company, Morton, Ill.; Commercial Electrical Supply Company, St. Louis, Mo., for the Home Enterprise Telephone Company, Woodworth, O. T.; The Pinckneyville Telephone Company, Pinckneyville, Ill.; Sullivan Telephone Company, Sullivan, Ind.; the Portsmouth Telephone Company, Portsmouth, O.; the York County Telephone Company, York, Neb.; Little Rock Telephone Company, Little Rock, Ark.; Stromberg-Carlson Telephone Manufacturing Company, for the Farmers' Telephone Company, Everett, Wash.

THE EWING-MERKLE ELECTRIC COMPANY, St. Louis, Mo., in its *Everbest Magazine* for November, prints a letter from a Nebraska farmer, showing how he and his neighbors installed a rural telephone system to enable them to have service for a very small cost. The usual number of bright and interesting special articles and verses are also included. The company will be pleased to send a copy to all interested persons.

THE AMERICAN STEEL AND WIRE COMPANY, the Rookery, Chicago, Ill., has issued a very attractive number of the *American Wire Rope News* for the month of October. A feature which may interest telephone men who have heavy guying to do is the description of the best method of splicing thimbles into wire rope. Not all men know that there is a right and a wrong way to clamp a wire rope about a thimble. To those who are not aware of the proper method the information given in this book will be both interesting and useful. Copies may be obtained by those who are interested by writing to the company.

THE DEAN RINGING KEY FOR PARTY LINE SERVICE.

AN essential feature of operating when selective party lines are used is the provision on the ringing key for each cord circuit of some means for indicating to the operator just what subscriber was rung last. Then if it is necessary to ring the second time the operator can press the proper key without hesitation or making an annoying request of the calling subscriber.

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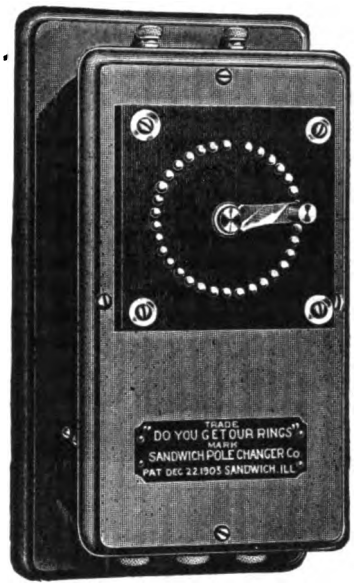
TO GET THREE OUT OF TWO SEEMS IMPOSSIBLE

Yet the Illinois and Sandwich Duplexers easily make two metallic circuits into three.



Just stop and think what this means to you in increased facilities without spending a cent for new line construction.

Here are the facts in the case: By connecting our duplexers to the two existing metallic circuits a new one is formed which utilizes each pair of wires as one side of an independent metallic line.

To eliminate all noise due to induction we provide a very simple and efficient balancing device which requires no skill in its manipulation and which will make the new circuit absolutely quiet.

Seems almost too good to be true. Let us prove it by sending a set on 30 days free trial.

We know you are interested; therefore don't delay, but write to-day.

Sandwich Polo Changer Company

400 Eddy Street, Sandwich, Ills.

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"A Little Investigation"

on your part will prove this

POLES, PINS, BRACKETS, X-ARMS, LINE CONSTRUCTION HARDWARE

Send Us Your Specifications for Lead-Covered Cable

Insulating Compound a Specialty

ASK FOR CATALOG GET ON OUR LISTS

COMMERCIAL ELECTRICAL SUPPLY CO.

ST. LOUIS, MO.

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In working out a design for such a key, the Dean Electric Company, of Elyria, O., has been very successful in securing that rigidity and simplicity of construction which are so essential for the satisfactory operation and maintenance of the apparatus. When the key is mounted in the switchboard all hidden contacts are of a normally open type, few in number, and are so constructed as to reduce the danger of trouble to a minimum. The only contacts in the talking circuit are mounted at the front of the structure so that when the key shelf is open they are in plain view.

The indication of the last key depressed is obtained by the lever partially returning to its normal position, as shown by the second button in Fig. 2. The release lever has a large throw so that it will always clear the locking pins, ample provision being made for wear. This obviates any possibility that two buttons will at one time become locked in the indicating position. The provision of an extra button for ringing bells bridged across the line is unnecessary, as in the Dean system any button can be used for ringing such bells.

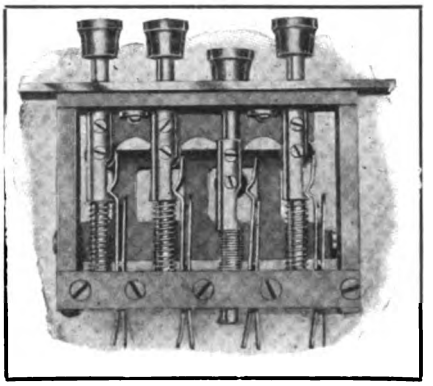

Fig. 3. Dean master ringing key for four-party service.

The side and end views of this four-party individual ringing key are shown in Figs. 1 and 2, while the circuit connections are represented in Fig. 4. In Fig. 3 there is illustrated one type of the Dean four-party master key for four-party selective and regular line ringing. Only a single key of this type is provided at one position and this is used for switching current of the proper frequency to the ringing springs of the keys regularly employed in the cord circuits. This key is especially useful at toll operators' positions, where economy in space is essential. The Dean Electric Company is prepared to furnish these goods not only on switchboards of its own manufacture, but for practically any type of switchboard in connection with which a four-party service is desired.

The National Conduit and Cable Company has within a few days issued a three-page folder entitled "Copper Gossip." This gives statistics concerning prices, output and demand for copper during the month of October, together with a comparison, last year's prices from the middle of October to the middle of November, to those of the current year. The export and import statistics for copper during the first ten months of this year are given as well as European statistics.

The company will be pleased to send copies of this folder to interested persons.

The Central Telephone and Electric Company, St. Louis, Mo., has just received from the press copies of its bulletin No. 25, showing its extensive line of telephone apparatus "made in St. Louis." Adopting the motto of the new St. Louis: "To the Front," this house has been remarkably successful in developing its business.

The Central Telephone and Electric Company not only manufactures a complete line of telephones and switchboards, but carries a very large stock of telephone construction materials and supplies. It will be pleased to send a complete set of catalogs to buyers for operating companies on request.

The Long Distance Telephone Manufacturing Company, South Bend, Ind., has recently made rapid progress in the art of telephone invention. All the designs of this company are said to have been evolved through its engineering and experimental departments and are essentially its own. Many of these designs are patented and patents on others are pending. Valuable patents and inventions have been developed in the transmission of sound. This improvement is in the microphone circuit. This is not merely an improvement in mechanical lines but by a discovery along scientific investigation.

The company states that it will not attempt to turn out any product unless it is thoroughly equipped to turn out the device from the raw material in the most modern and up-to-date manner. Each department is thoroughly equipped. All drillings and fittings are done by steel bushed jigs and templets, securing absolute accuracy and uniformity of product. The product bears throughout the mark of skilled workmanship, a condition which is only reached by infinite attention to detail throughout the entire plant.

The Automatic Electric Company, of Chicago, Ill., reports that the Home Telephone Company, of San Francisco, has signed contracts for automatic telephone equipment to provide for the immediate installation of 100,000 lines.

The Holtzer-Cabot Electric Company, Brookline, Mass., and 395-397 Dearborn street, Chicago, Ill., describes in its booklet No. 148AA the well known Ness automatic intercommunicating systems. This booklet not only gives wiring diagrams for a magneto call system connected to a magneto exchange and for a common battery system connected to a common battery exchange, but gives complete information concerning the instruments for use in systems of this class.

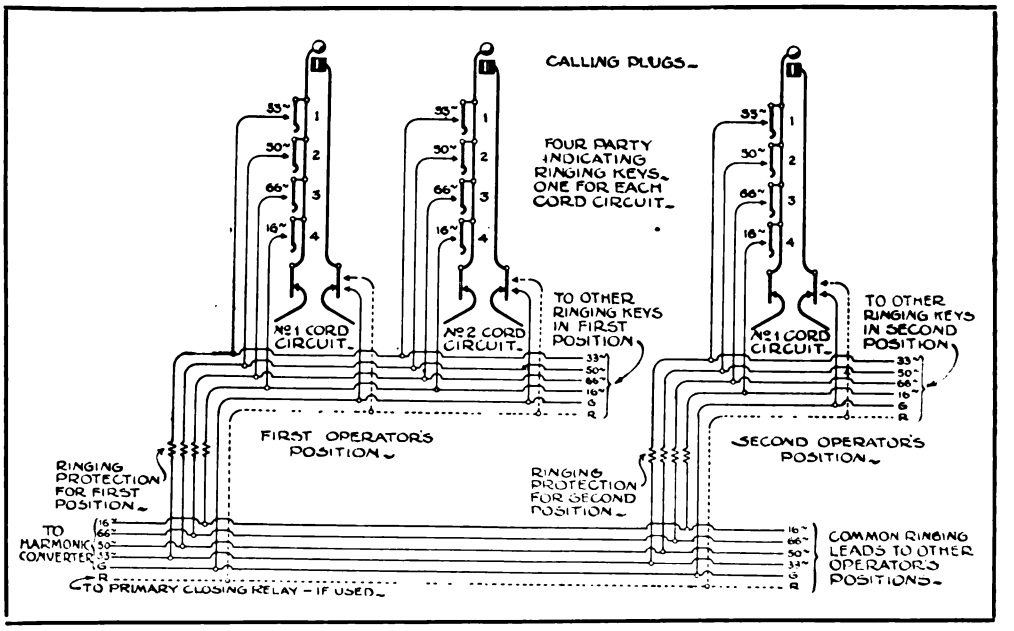
CALLING PLUGS
FOUR PARTY INDICATING RINGING KEYS, ONE FOR EACH CORD CIRCUIT
No 1 CORD CIRCUIT
No 2 CORD CIRCUIT
TO OTHER RINGING KEYS IN FIRST POSITION
No 1 CORD CIRCUIT
TO OTHER RINGING KEYS IN SECOND POSITION
FIRST OPERATOR'S POSITION
SECOND OPERATOR'S POSITION
RINGING PROTECTION FOR FIRST POSITION
RINGING PROTECTION FOR SECOND POSITION
TO HARMONIC CONVERTER
TO PRIMARY CLOSING RELAY - IF USED
COMMON RINGING LEADS TO OTHER OPERATORS POSITIONS

Fig. 4. Wiring of four-party key, arranged for connection with Dean harmonic converter.

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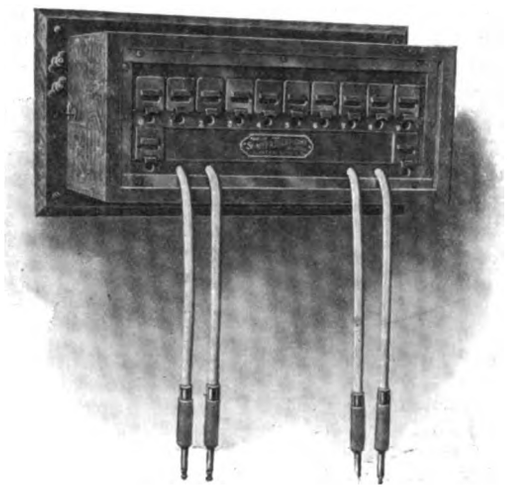
SMALL SWITCHBOARDS

These Boards represent the ideal equipment for small exchanges of 3 to 20 lines. All parts are standard Sumter parts as illustrated in our bulletins describing the larger Unitype switchboards. This eliminates all troubles due to the cheap construction usually found in small boards.

The 10 line board consists of one standard UNITYPE Jack Strip and 10 UNITYPE drops. The Cabinet is wired for night bell, the bell, batteries and switch being connected to posts shown in illustration.

Two cord circuits are furnished with the 10 line board, each one complete with standard high wound clear-out drop. A listening jack is also provided so that by placing the "operator's plug" in the "listening" Jack the operator can ascertain if the parties are through in case they fail to ring-off.

The operator's plug is connected directly to the line posts of an ordinary telephone, which serves as an operator's set. All talking and ringing is done with this 'phone, which eliminates all keys, buttons, complicated circuits, etc., in the Switchboard.



The operation of the board is extremely simple. When a 'phone calls, the drop falls, and operator answers by plugging into the jack with operator's plug. Upon ascertaining the number wanted, the operator puts operator's plug in jack of party wanted and rings them by simply turning crank on telephone, there being no keys, etc., to operate. The two parties are then connected by a pair of cords in the usual manner. When parties **ring off,** the clear-out drop falls, and operator takes down plugs. As a listening jack is connected to each pair of cords, in case parties do not "ring off," Central can "listen-in" on the cord circuit same as in larger boards.

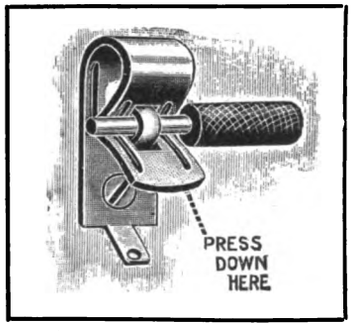
20 Line Boards are identical, except two rows of drops and 3 cord circuits are furnished.

. . . Get Bulletin 40X . . .

The Sumter Telephone Mfg. Co.

SUMTER, SOUTH CAROLINA

SOLDERED connections are unnecessary on distributing boards, lightning arrester frames, cross connecting boards and many other places in every telephone exchange. Prominent manufacturers will supply apparatus equipped with the Fahnestock Spring Binding Post. Insert the wire under the spring and it is there to stay forever. It makes as good a connection as you can secure by soldering and there isn't the danger of breaking. A slight pressure releases the wire at any time for testing. Write for particulars. If you're not using them on your batteries now, write for a sample and specify them in your next battery order. They cost no more than the troublesome screw post. Write today.



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The Calculagraph

is a timing instrument for toll messages. It gives results, increased revenues, better service. The **EXACT DURATION** of the conversation is determined and printed on the toll ticket. Should be in every exchange.

It Makes No Clerical Errors.

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1437 Jewelers' Building New York City
Agents for Canada: Northern Electric and Manufacturing Co., Montreal.

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THE WEEK'S MESSAGES

NEW COMPANIES.

GRASS VALLEY, CAL.—The farmers of Clear Creek have organized a telephone company to connect with Grass Valley. They will start at once to put up poles and string the wires. E. B. Odell is president; W. T. Williams, vice-president; Mrs. L. Black, secretary, and Thomas Loney, treasurer.

MODESTO, CAL.—A new Farmers' Telephone Company has been organized at Modesto, and work on its system wil be commenced at once. Lines will be built to Dry Creek. Those interested in the project are Frank Gomez, H. L. Thompson, E. F. Hutchings, Frank Goodwin and W. H. Palmer.

NEW ATHENS, ILL.—The Eastern Farmers' Telephone Co. of New Athens, capital stock $400, has been incorporated. The incorporators are Henry Kaiser, George Irwin and R. O. Haupt.

PONTIAC, ILL.—The Livingstone County Home Telephone Company of Pontiac, Ill., has been incorporated at Wilmington, Delaware, with a capital stock of $200,000, to construct, maintain and operate telephone and telegraph lines.

RANTOUL, ILL.—The Coon Brothers Telephone Company has been incorporated with a capital stock of $60,000. The incorporators are J. S. Coon, E. G. Coon and R. O. Coon.

CHALMERS, IND.—The Chalmers Telephone Co., White County, has been incorporated with a capital stock of $10,000, with the following incorporators: J. C. Chamberlain, A. G. Fisher & Son; Ross, Ross & Barr; R. V. Anderson, M. O. Raub and C. E. Smith.

CORYDON, IND.—The Harrison County Farmers' Telephone Company, of Corydon, has been incorporated with the following directors: T. J. Stevens, Crandall, Ind.; C. B. Anderson, Corydon; D. C. Curvis, New Salisbury; John Gluitz, Corydon; Louis P. Wagner, Crandall. The capital stock is $5,000.

GREENFIELD, IND.—The Westland Telephone Company has been incorporated with a capital stock of $260 and will construct a telephone system in Hancock County. The company is in the market for material and switchboard. The following directors have been elected: J. F. Coffin, W. H. Power, Levi Gulley, Henry Cobb, John S. Curry and R. B. Binford.

MOORE'S HILL, IND.—An Independent telephone company, to be known as the Moore's Hill Telephone Company, has been organized at Moore's Hill by the business men of that place. An up-to-date exchange is to be established and lines built into the surrounding country. The company will have connections with the Southern Indiana Telephone Company for the east and the Osgood Telephone Company for all points north and west.

FORT DODGE, IOWA.—The Dayton Mutual Telephone Co. has filed articles of incorporation. The principal place of business of the company will be at Fort Dodge and the capital stock is to be booked at $25,000.

CANTON, KAN.—Articles of incorporation have been filed by the Canton Telephone Company, of Canton, Kan.

LANSFORD, N. D.—The first Farmers' Telephone Association of Lansford has been incorporated with a capital stock of $14,000. The incorporators are C. H. Knudson, Jesse Bates, Lansford; R. H. Star, Maxbass.

BERESFORD, S. D.—Articles of incorporation have been filed by the North Star Telephone Company at Beresford. The company has an authorized capital stock of $25,000, and the incorporators are A. C. Roomison, E. W. Owen, A. Johnson, A. H. Anderson and George Determan.

BERESFORD, S. D.—The Pleasant Telephone Company has been incorporated with a capital stock of $10,000. Among the incorporators are Alfred Volin, C. E. Larson, E. A. Lundborg, Henry Hunter and James Hunter.

LORTON VALLEY, VA.—The Lorton Telephone Company has been incorporated to construct telephone lines in Prince William, Fairfax and Alexandria counties. The capital stock is placed at $5,000, and the incorporators are: Howe Totten, president; D. Morgan, W. R. Ward, F. H. Elmore and B. O. Holt, all of Fairfax County.

FRANCHISES.

EATON, COLO.—The Northern Telephone Company has secured a franchise to erect a telephone system in Eaton.

ALBION, ILL.—Application for a franchise to operate a telephone system in Albion has been made by the Westfall Telephone Company.

HENDERSON, KY.—The Central Home Telephone Company, which controls the Henderson Telephone & Telegraph Company and a number of other Independent plants, is seeking a twenty-year franchise at Henderson.

CARIBOU, MAINE.—The Independent Telephone Company has petitioned the selectmen to allow them to construct their lines in the town of Caribou.

PIONEER, MICH.—The Hillsdale County Telephone Company was granted a franchise to establish a telephone exchange in the town of Pioneer. The officers of the Hillsdale County Telephone Company have been here making arrangements for this exchange.

RIPLEY, OHIO.—A number of citizens of Ripley have been granted a franchise to construct an Independent telephone system in this place.

THORNVILLE, OHIO.—The village council passed an ordinance granting the Perry County Telephone Company of New Lexington, Ohio, a franchise in Thornville.

WAYNESBURG, PA.—The council of Waynesburg has granted a franchise to the Greene County Telephone Company, permitting it to construct lines in that city.

MONTPELIER, VT.—The Orange County Telephone Company has applied for permission to extend its lines in Montpelier.

FINANCIAL.

NEW BEDFORD, MASS.—The petition of the Automatic Telephone Company of New Bedford for the authority to issue increased capital stock to the amount of $50,000 has been granted. The capital stock is divided into one thousand shares of the par value of $50.00 each.

MINNEAPOLIS, MINN.—The Tri-state Telephone Company has declared its fourteenth quarterly dividend at the rate of 6 per cent. per annum, payable December 1, 1906, to stockholders of record of November 22, 1906. The company under its guarantee will also pay the nineteenth quarterly dividend of the Twin City Telephone Company at the stipulated rate.

DELAWARE, O.—At a special meeting of the stockholders of the Citizens' Telephone Company, it was decided to increase the capital stock of the company from $125,000 to $200,000. From the reports made at the meeting, the company was shown to be in a most prosperous condition.

COMBINATIONS.

FRANKFORT, IND.—The New Long Distance Telephone Company of Indianapolis, which has already made contracts with the co-operative companies at Manson, Scircleville, Geetingsville, Michigantown and Mulberry, is seeking to establish the same relations at Frankfort. In case it is successful it is its intention to install a complete local and long distance plant at that point.

BAHIA, BRAZIL.—The Telephone Company at Bahia, Brazil, formerly owned by Senor Pedro Caminha, has passed into the possession of Messrs. Guinle & Company, the purchase price being $133,333. The system is to be entirely rebuilt and a new central office erected.

ELECTIONS.

LERNA, ILL.—The following officers have been elected by the Lerna Mutual Telephone Company: President, John Riley; vice president, J. L. Connell; secretary, R. G. Hall; treasurer, Mark Worthain.

CLARINDA, IA.—The new officers now in charge of the business of the Farmers' Mutual Telephone Company are: William Wehmiller, president; Thomas Winger, vice-president; Frank Brokaw, secretary; J. H. Wagoner, treasurer; E. Fleenor, director.

NEWS—WANTED

THE matter contained upon the message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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¶ Now in the Lusty Winter Month of December, do I, The Blacksmith of Chicago, offer in open Mart, Good Tools and Iron Things for Poles. These have I wrought from Sound Iron nor cast a single one as is the custom of certain evil Smiths. ¶ In good sooth, if thou wouldst know more of this affair, do but let me know and a goodly scroll will be sent to thee with prices and if thou wilt with samples in good measure.

Hallett Iron Works

96 WEST POLK STREET

CHICAGO, ILL.

SUBSCRIBER'S LEASE AND TOLL LEDGERS

Write To-Day For Samples and Prices. Toll Bills. Rental Bills

Form G-90. For Small or Branch Exchange use; carries account for 2 years.
Form G-90-A. For Large and Medium City Exchanges and Systems of Exchanges; the most complete form made.
Form G-90-B. For City Exchanges having many Rural Lines.
Form G-90-C. For City Exchanges, Rentals and Toll Charges separated.
Form G-90-E. For Small Exchanges, Rentals only.
Form G-90-F. For Small Exchanges, Tolls only.
Form G-90-G. One subscriber to a sheet; carries account 4 years.
Form G-90-H. One subscriber to a sheet; carries account 12 years.
Form G-90-I. For Small Exchanges; Bound Books; carry 12 subscribers on a page for 1 year.

THE Edwards-Hine Co.

TELEPHONE SYSTEMATIZING DEPT.
5 and 7 PEARL STREET (EAST), GRAND RAPIDS, MICH., U. S. A.

PUZZLED OVER THE BATTERY PROBLEM

We don't wonder some users of dry batteries are in a quandary. Glance through any of your trade papers and you see no less than a half dozen dry batteries advertised, and each one claims to be the best, while this, of course, could be true of but one.

Why not reason this way? The battery that has been on the market for the longest period with a constantly increasing sale is apt to be the BEST battery.

There's nineteen years' experience behind Nungesser Batteries and they are sold to-day in nearly every country on the globe.

That's worth considering. We'll let YOU say they're the best after you've tried them.

Stromberg-Carlson Tel. Mfg. Co.

ROCHESTER, N. Y. CHICAGO, ILL.

MICHIGAN WHITE CEDAR POLES

In addition to the several yards we have had in the past, we wish to call your attention to our new yard which is located at Escanaba, Mich.

The acquisition of this new yard enables us to ship poles by all railroads or by the lake routes, thereby enabling us to give the best delivered prices.

The location of our new yard makes it easier to secure cars, thus facilitating prompt shipment.

In many cases poles can be shipped by car-ferry, making possible a great saving in cases of shipment to Eastern points.

We are wholesalers exclusively, shipping in car lots only.

Write us for delivered prices and "Pole Booklet No. 3-A." Yours for the asking.

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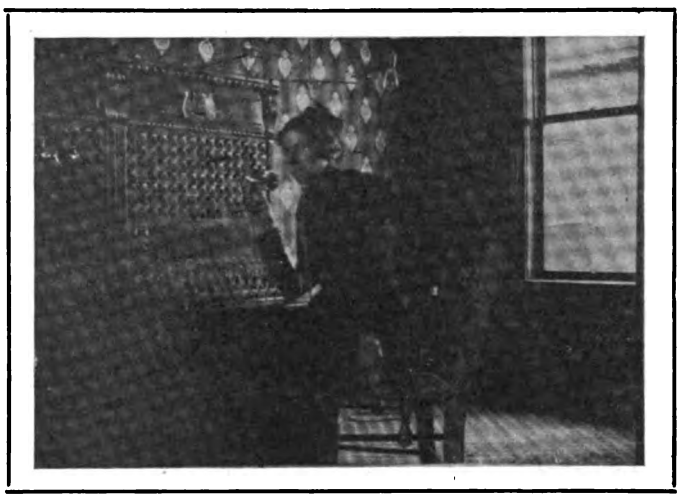

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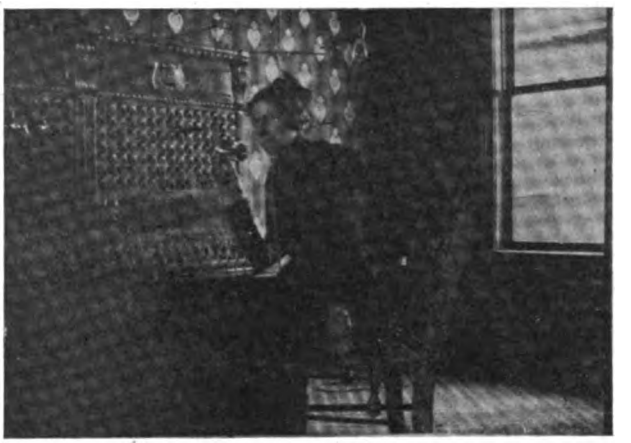

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Owing to this substantial increase in the system, and the desire on the part of the management to make use of every known improvement which would make it possible to give a better and more economical service, it was determined to be necessary for the company to reconstruct all of its nine exchanges. This company is thus seen to be one of the many which at the time of its first construction, had no idea to what extent its business would reach and, therefore, its switchboards and cables were inadequate to accommodate the hitherto unprecedented demand for telephone service.

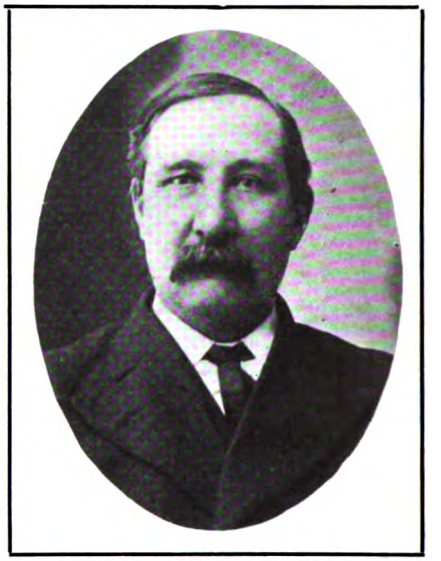
J. K. Johnston, Vice-President and General Manager.

On September 1st, 1905, Jas. S. Brailey, Jr., purchased the controlling interest of the company, with a view of reconstructing the plant, increasing its rates, and adopting party line systems. Under the old rates it was found that the revenue the company was receiving would not be sufficient to pay operating expenses and to pay dividends and give the best grade of service. Accordingly it was settled that after reconstruction the rates should be as follows: Independent line, business, $30; independent line, residence, $18; 4-party line, business, $24; 4-party line, residence, $12; rural or country service, from $12 to $18, according to the class of service furnished. These rates are now in effect, party lines equipped with Dean harmonic telephones having been cut into service on Jan. 1st, 1906.

The outside plant prior to reconstruction was all iron wire, with a small amount of cable, and on account of the sulphur conditions from the coal mines and iron mills in the towns and coal mining districts, the iron wire that the company had strung became practically worthless in the four years of its operation. Therefore all the old wire was taken down and replaced by cable and copper. There have been over 66,000 feet of new cable put up.

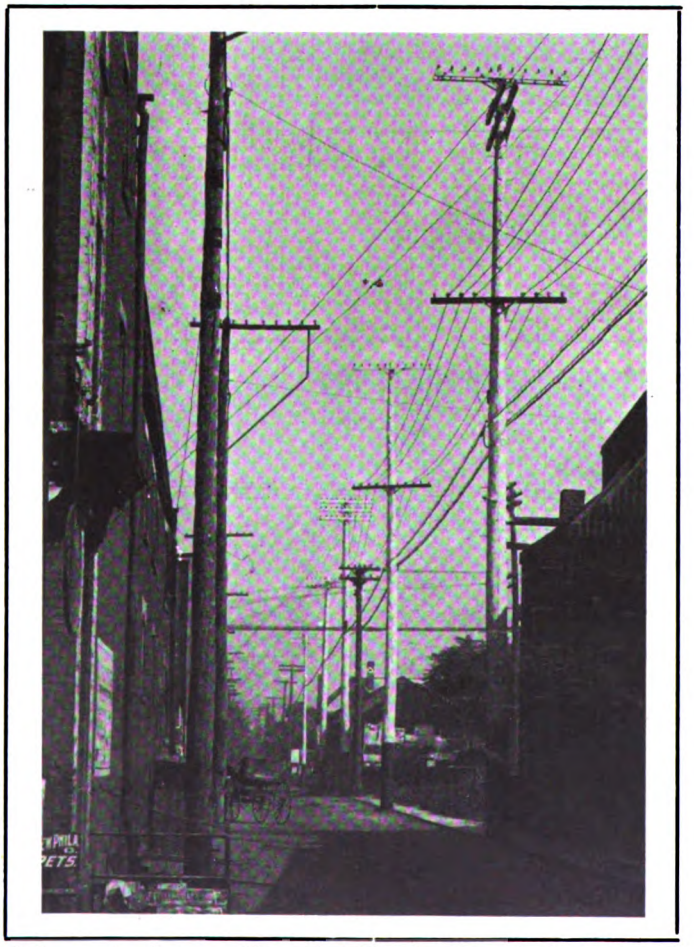
New Philadelphia completed the installation of a 1,000 line Stromberg-Carlson central energy party line switchboard on May 1st, 1905.

The towns of Uhrichsville and Dennison are so closely connected that it was decided to install but one exchange for the two towns. This necessitated the stringing of two cables of 250 pair each 5,500 feet. This arrangement allows the lines of what were formerly two exchanges to be brought to one central office and lessens the expense of the company in the way of operators' salaries, rent and maintenance. On June 1st the combination into one exchange was effected and a new central energy 840 line Sterling Electric switchboard is now used in place of the two old boards. The company is installing at Canal Dover an 840 line central energy 4-party line Dean Electric switchboard. At this place the company will add in the next year three or four hundred new subscribers, as the demand for telephone service at this point is more than it has been able to take care of with the old equipment. Under the new arrangement with party line service and with the cable in multiple, the company will have outside facilities sufficient to connect 500 new subscribers. Iron wire has been replaced with copper at New Comerstown, Tuscarawas and Mineral City.



Chas. H. Slingluff, President.

All these exchanges are at present in such condition as to form one of the best reconstructed county systems in the State. It is generally agreed that the plant at New Philadelphia is a model telephone plant in every respect. Multiple cables cover the city, leaving practically no open wire, and the facilities for adding new subscribers are unusually good. This is shown by the fact that on an ordinary day a lineman and a trouble man put in six new telephones and moved one. There is one trouble man in New Philadelphia for 1,250 telephones. Trouble records for the months of August and September show an average of three cases per day. From August 25th to 29th there was not a reported case of trouble in the exchange. Subscribers are enthusiastic, and General Manager J. K. Johnston is so thoroughly pleased with the results that he says: "I have never yet been manager of a telephone plant that was better constructed, and had less trouble for the number of telephones than the one in New Philadelphia, and I wish to impress upon other companies the importance of constructing and rebuilding their plants in such a manner as to save the maintenance."



A Construction Feature. This 55-foot Pole Line Formerly Carried One of the Heaviest Open Wire Leads. The Present Cables Have Been Substituted.

(*To be continued.*)

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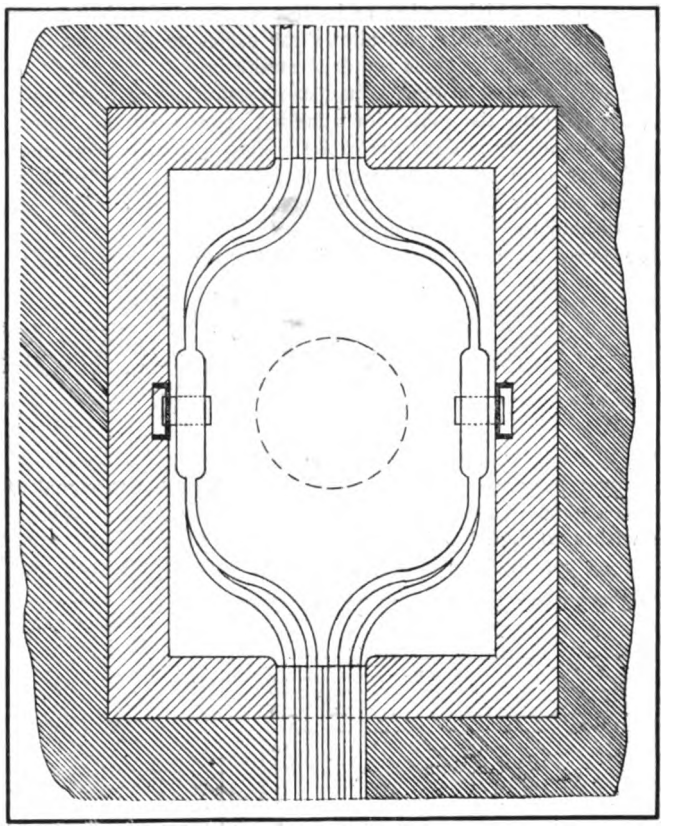
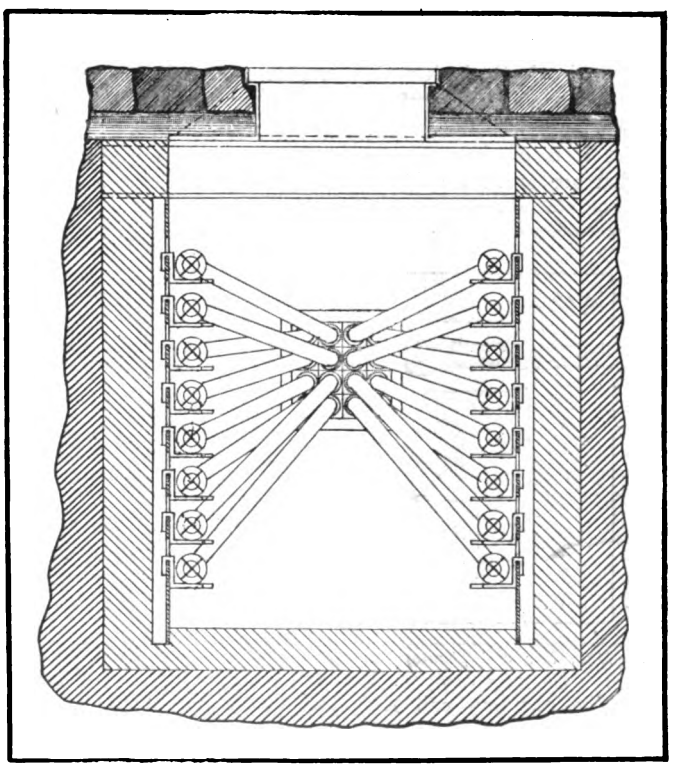
The Proper Racking of Cables in Manholes

By O. R. Barnes.

A FEW years ago the telephone company operating in New York experienced a very rapid and unexpected growth in its business, which necessitated pulling in and splicing up hundreds of cables within a short period of time. This was during the days when cables were made with a maximum of 50 pairs of wires, and to cope with the situation every available duct was mustered into service and every inch of subway was taxed to its utmost capacity. The business came so quickly and was so unforeseen that it may fairly be said to have caught the officers of the company napping and compelled them to rush work through day and night in a half-awake attitude to keep up with the public demand. The cable department had all its energies occupied in a struggle with a problem up to that time new to its experience and utterly foreign to any previous conditions which had arisen in the conduct of the telephone company's business. Obstacles presented themselves at every turn and in a hundred different forms. Subways had been built and manholes provided to receive the cables—but such subways, such abominable manholes; manholes with the ducts spread out over the whole wall, number one duct up in the extreme right hand corner, number ten duct down in the extreme left corner, and the nth duct the devil knows where. The subway engineer laid out his work and completed it according to his judgment, and there it was ready for the cable engineer—a jumbled mass of concrete and tile. All of the ducts were of the two inch variety designed for 50 pair units. When the cable men rodded a duct they were not absolutely certain where the rods would come out, owing to the many fancy twists and bends used in their construction, and they always proceeded cautiously for fear that one might pop out at some unexpected place and strike an unwary helper in the eye. Conditions were so bad that the cable department became rather disgusted, and appeared to care little how the cables appeared in the manholes, if only they would work. One cable after another was pulled in regardless of the future until the manholes became filled with a tangled congested mass, with the cables wedged in all kinds of shapes. Things moved along happily thus until the cables began to give way, mechanically, due to the strains on them, and then there came an awakening one morning when five cables got in trouble and were all found to be down in the bottom of the manhole, under a hundred others, all imbedded in about two feet of mud. It was indeed a funny sight on that chilly morning to see Tom, Dick and Harry standing around that manhole trying to devise some way to get at those cables. There was only one thing to do, and all agreed that this was to dig a hole and tunnel under the manhole—and that is precisely what they did. The knowledge gained from this lesson although costly was at once made valuable, and thenceforth cable racks were provided and have been used ever since. Now, when conditions get so that there is no room for the proper racking facilities the manhole is immediately rebuilt to make room.



Plan of Manhole Showing Course Taken by Cables Laid Up Along Its Side Walls.



Sectional View of Manhole Showing Preferred Method of Bringing Out Cables from 16-Duct Conduit to Racking.

It did not take the alert superintendent long to see that something else was required besides cable racks. He was not altogether satisfied with the way his men made use of this new acquisition, so he organized a gang called the "cable racking gang"" to select ducts and design racks in advance of pulling in the cables, and with the aid of diagrams and verbal instructions educated the men into this part of the business which is to-day a job requiring as much skill as any in the department. This gang of men, composed of experienced cable splicers, is held strictly responsible for the condition of the cables in the subways, and is expected to select ducts and racks so as to make the work as easy as possible for the cable pulling gangs and splicers. Beyond all things the cables must be arranged in the manholes with the pot-heads or splices in the most accessible locations. For more than seven years this gang of men has been turning out ideas which have greatly increased the working efficiency of the department.

A new form of cable rack which promises to give good results is shown in the accompanying drawings. It is a steel channel which is mounted in the wall of the manhole, measuring ½" x 8"

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with flanges of 2½"; this channel is slotted for T-shaped brackets made of ½" x 3" steel bars. In straight runs where the subway enters the manhole in only two directions these channels are placed in each wall running parallel with the subway either at one side of the splice or else directly opposite it. At street intersections where the subways enter in four directions, there are four channels used and they are placed in accordance with the layout of the manhole. These racks will no doubt take the place of the old malleable iron rack, which, owing to its low grade of ductibility gets out of shape too easily and allows the cables to drop out frequently, and often becomes ruptured at the joint.

One of the worst crimes a man can commit when entering a manhole is to use the cables for a ladder. It is from this source that serious injury is done the cables. This new rack overcomes this danger to a considerable extent, inasmuch as the brackets protrude out far enough to enable a man to get a foothold on them without touching the cables.

The drawings here presented show the best duct selections and methds of racking cables for straight runs and suggest the conditions that should obtain in all manholes.

ILLINOIS INDEPENDENT TELEPHONE MEN IN THE FIFTH DISTRICT TO MEET AT PEORIA.

TELEPHONE men from the Fifth District of the Illinois Independent Telephone Association will hold their semi-annual session at the Hotel Fey, Peoria, Ill., Dec. 20.

Among the speakers will be G. H. Glass, of Pekin; Mr. Wheelwright, of Roanoke; E. S. Starrett, of Henry; John H. Troy, of Bradford; and R. C. Crichfield, of Minier. Mr. Glass' subject will be "The Managers' Duty to the Company and the Patrons." Mr. Crichfield will speak on "Telephonic Hoodoo."

State Secretary C. B. Cheadle is on the programme for an address. Mr. Cheadle has recently been spending much time in Canada, and his paper will be along the lines of the development in that country. An interesting meeting is assured and a large attendance is expected.

Some Useful Applications of the Phantom Circuit

By H. M. Rounce.

DUPLEXING can be used to good advantage for signalling over heavily loaded lines where it is advisable to signal a telephone without ringing any one else on the line. Where one wishes to signal only and the phantom coils are not used for direct conversation a duplex coil can be made at very low

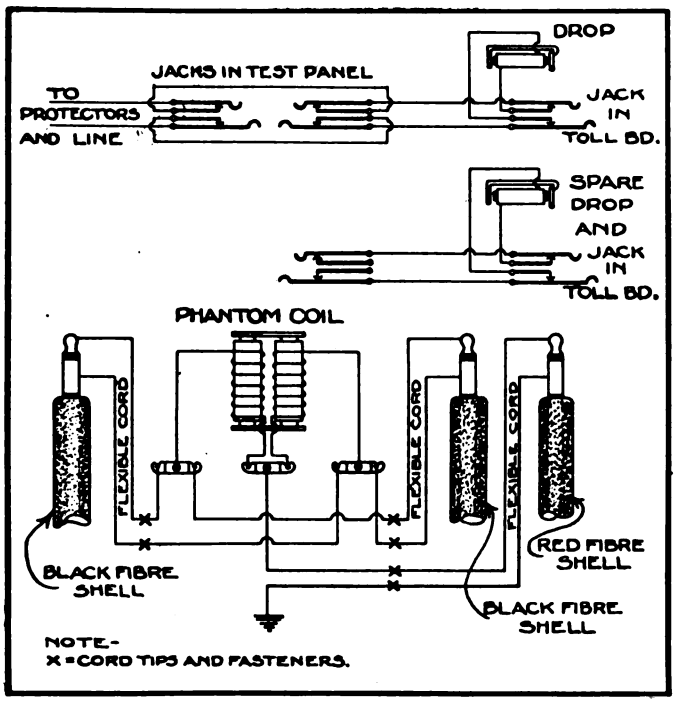

Fig. 1.—Arrangement for using phantom coil where lines enter toll board through test panel and it is desirable to terminate phantom coil on plugs for connection with any one of several lines.

cost from a pair of 1,600 or 2,000 ohm bridging ringer coils, and it will give very good results. To make the duplex coil, take off the striker armature and permanent magnet from the ringer coils and fasten an iron bar across the pole pieces to close the magnetic circuit. Connect the ringer coils across the metallic line the same as any other bridging telephone, and solder a wire to the winding of the coils at the point where they are joined together, using this wire for the new signalling line. Fig. 1 will show the details of the circuit. This circuit is being used on a line over fifty miles in length that is so heavily loaded that a signal between the terminal points is impossible. The signal comes over the phantom very plainly and is in use constantly as the traffic is very heavy between the terminal stations.

The same coils may be placed somewhere in the cabinet of most types of bridging telephones and their correct use will make it possible for one to place a subscriber on some toll line where he can call and be called from some one office only. That office can be charged with the checking of all business over that telephone. In Fig. 3 is given the circuit of the usual bridging talking set combined with the phantom for signalling. This circuit must be installed on a line equipped with the phantom circuit (as given in Fig. 1) at one end only, unless it is desired that the party be reached from more than one station.

By using some of the coils made for such work one can use a metallic line and get a circuit over which it is possible to talk very well. The operators will find uses for it in making appointment calls when the main line is busy with through or local business. If the main line becomes crossed the phantom can still be used between terminal points for an emergency circuit until the line is cleared up. It is necessary that the ringing power used where duplex coils are placed shall be metallic. If this is not done the drop on the duplex circuit will be rung down whenever a signal is sent over the metallic line.

Where it is possible to arrange it so it is best to have all lines that are to be used in this manner come through a test

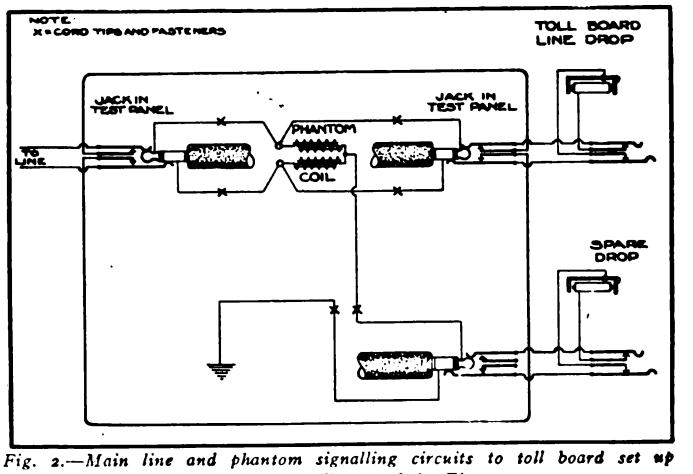

Fig. 2.—Main line and phantom signalling circuits to toll board set up with apparatus illustrated in Fig. 1.

panel. The phantom coil can then be connected to double contact plugs so it can be used or not as one wishes. It also enables one to clear the line of the grounds caused by these circuits. If a pair of single contact plugs are wired up to a

(*Continued on page 376.*)

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QUERIES

SIMPLEX TELEGRAPH CIRCUIT.—(799.)

We wish to arrange for building up a telegraph circuit through a series of telephone exchanges. Enclosed diagram shows the lengths of lines, number and type of telephones tapped off of some of the through lines, locations of central offices and desired locations for telegraph instruments. Will you please tell us what apparatus to use? Would a repeater be necessary at switchboard No. 2? J. D. M.

One of the most satisfactory arrangements for telegraphing over your telephone lines is by using parallel wound repeating coils as illustrated in Fig. 799-*a*. These coils should be perfectly balanced electrically. When such a coil is made up from four wires cabled and wound on the repeating coil spool together, the resistance, number of turns and relation to other parts of the coil of each quarter of the winding is the same. Connections of coil adapted for this purpose are illustrated in Fig. 799-*b*. The wire in each quarter of this coil has a resistance of 170 ohms, or a total of 340 ohms across the telephone circuit. The retardation for voice currents, however, is very great, so no appreciable cutting down of transmission will be noted from this source. There will be a slight loss due to repeating from one half of the coil to the other half which would add up to a fairly large loss when telephoning between the extreme stations on your connected circuits. This should not prevent your using the telegraph scheme, provided your lines are in good condition.

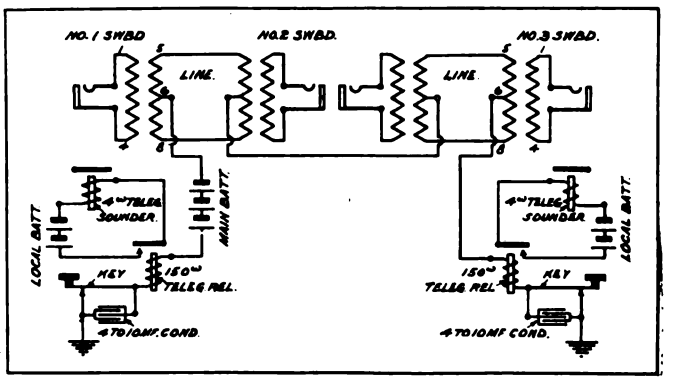

Fig. 799-c.

The proper method of connecting the telegraph circuits through the different switchboards is shown in Fig. 799-*a*. There should be no earth returns excepting at the extreme ends of your telegraph circuit, the intermediate stations being connected in series. This would also apply in cases where portions of the entire circuit are used for separate telegraph circuits. Fig. 799-*c* illustrates a case of this description, switchboard No. 1 being connected through to switchboard No. 3 for telegraphic purposes, the remainder of the telegraph circuit from switchboard No. 3 to switchboard No. 5 being free for separate telegraph circuits between any two points.

If the entire circuit from switchboard No. 1 to No. 5 is to be used as a whole, only one main telegraph battery will be necessary, as shown in Fig. 1. When subdivided, however, separate main line batteries will be required in each telegraph circuit.

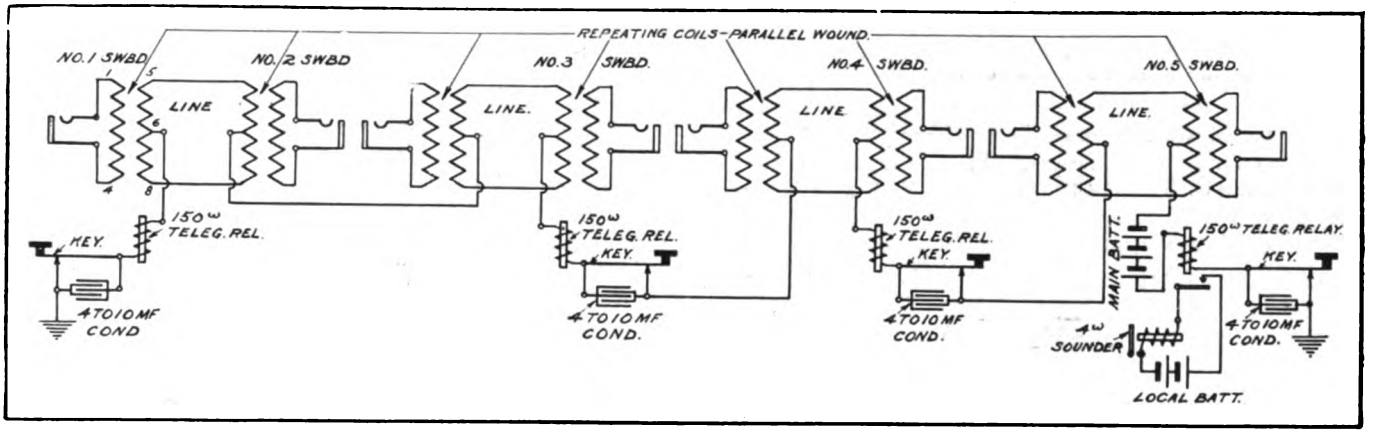

Fig. 799-a.

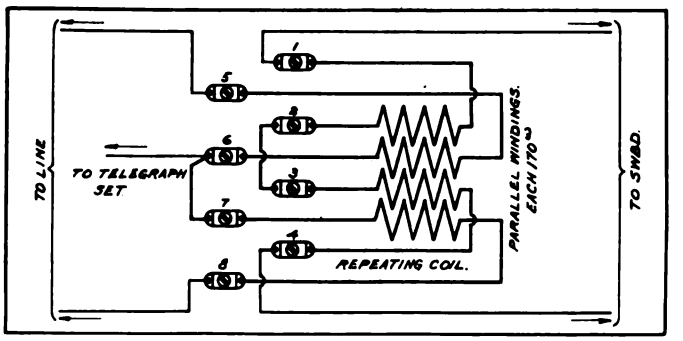

Fig. 799-b.

Simple telegraph relays wound to 150 ohms should be used in the telegraph line circuit, while ordinary four ohm telegraph sounders with local gravity type batteries can be used at each station for signaling purposes. The circuit connection of this apparatus and that of the telegraph key is shown in the accompanying illustrations.

With balanced line conditions and with the repeating coils previously described, it is, possible to telegraph over these circuits without noise in the telephone sets, but in most cases it is necessary to place a condenser of about four to ten M. F. capacity around the telephone key in order to insure quiet in the talking circuit. The size of the condenser is best found by experiment, after the circuits are connected and can be made up from several standard 2 M. F. telephone condensers.

In using a very long circuit it may be advisable to insert at the other terminal from the one where the "main battery" is shown in our sketches an additional battery to act as a booster. In this event the second battery should be connected with its positive pole to line, so that it will work in series with the battery at the other end.

Care should be taken that a proper scheme of transposition is in effect upon all poles carrying a circuit such as you propose to set up, otherwise you will be likely to get not only cross talk, but induction from Morse signals. Low insulation, high resistance joints, and other causes of an unbalanced condition bring in objectionable troubles.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

TAX LAWS OF NEW YORK.

We wish to know the law of this state in regard to taxing a pole line in the public highways. We pay to the state a franchise tax which we supposed covered all tax in the highways. The town assessors place a valuation per mile and a town tax, also a district school tax in each school district. F. H. T.

THE latest provision on taxation of telephone companies in your state is found in Vol. 1 of the laws of New York for 1902, which amends section 42 of Chap. 908 of the laws of 1896. By the latest enactment the State Board of Tax Commissioners are to determine the valuation of each franchise subject to assessment in each taxing district, and the assessors are to include it in the assessment roll. Even if this law expressly provided that companies paying the tax therein imposed should be exempt from all taxation, it would still be lawful for municipalities to place a license tax upon each pole in the public highways within the municipal boundary. The theory of these pole taxes is that they are to reimburse the municipal government for the expenses of regulating and supervising the line within its particular territory. These pole taxe. are levied under the exercise of the police power, not of the taxing power, and while designated as "taxes," should really be called "license fees." The fees must, however, be reasonable and not exceed what is properly necessary to reimburse the municipality for its actual expense. Postal Telegraph Cable Co. v. New Hope (U. S. Sup. Ct.) 5 Adv. (L. Ed.) 205. Norwood Borough v. W. U. T. Co., 25 Pa. Super Ct., 406; Braddock Borough v. Alleghany Telep. Co., 25 Pa.

TELEPHONE COMPANIES WIN PERSONAL DAMAGE SUIT BEFORE JURY.

AT St. Paul, Minn., the Tri-State and Twin City Telephone Companies received a verdict at the hands of a jury in the case brought against them by C. R. Parmelee for $10,000 damages. His injuries were alleged to have been received by coming in contact with a telephone wire that was broken by a storm the night before and was dangling above the sidewalk near Prior and University avenues at six o'clock on the morning of May 24th. The electricity with which the wire was charged was increased in quantity by the wires coming in contact with a wire of the city railway company. The time that elapsed between the breaking of the wire and the accident was so short that the defendants contended they could not be charged with knowledge of its condition. They also alleged contributory negligence on the part of the defendant. The verdict is a complete vindication of the telephone companies.

CUMBERLAND TELEPHONE COMPANY FINED IN FORTY-FIVE CASES.

AT Tullahoma, Tenn., the Cumberland Telegraph & Telephone Company has obtained a temporary injunction restraining the mayor and aldermen of the city from interfering with the telephone plant there, and from issuing further warrants for the arrest of the local manager of the company. The litigation is the result of an attempt by the municipality to force the telephone company to pay a larger fee for the privilege of doing business in the city. The company had been paying $17.50 per year until this year when it agreed to pay $36.25. A special committee was appointed to see if more could not be extorted, with the result that the company had agreed to pay $236 per annum, but the committee wanted $500. The board of aldermen and mayor then passed an ordinance directing the company to remove its poles from the streets where they now stand, and providing that if the poles were not removed by October first, the company should be adjudged guilty of a misdemeanor, and fined $25 for each day the poles were left standing. Forty-five days elapsed and no action was taken by the telephone company, so the municipal authorities caused the arrest of the local manager, who was convicted, and fined $25 for each of the forty-five days, the total fine being $1,260. The company has no franchise to do business in the city, but has a permit under a resolution passed many years ago.

TEST NECESSARY FOR TELEPHONE TRANSMITTER MECHANISM.

THE following principles have been laid down in a recent decision of the United States Patent Office:

Where a telephone transmitter device which contains a disclosure of the invention was constructed for the purpose of illustration merely, so that a commercial instrument could be built from its design, and was never put in circuit or tested, it was held not to be a reduction to practice, but only an evidence of conception.

It was also held that a mechanism adapted to be put in a telephone-circuit is not a simple invention, such as needs no test, and that an actual operation of the same in a telephone-circuit to determine whether it is capable of performing the work for which it is constructed is essential in order to warrant the conclusion that the device is a reduction to practice.

When an assignee of an invention neglects to cause an actual reduction to practice of the same when a complete model has been submitted to him by the inventor or to cause an application for a patent to be filed and the inventor takes no active steps in either direction, it was held that some one interested must be diligent, and the inventor cannot excuse his lack of diligence by shifting the responsibility to the assignee, who was admittedly not diligent. O'Connell v. Schmidt, 118 O. G. 588.

CONTESTING FRANCHISE ELECTION IN DENVER.

AT the recent election in Denver, Col., the question of granting a franchise to the Automatic Telephone Company was submitted to a vote of the electors. The vote was in favor of granting the franchise, but the Colorado Telephone Company caused an injunction to be issued restraining the County Clerk from certifying the vote cast. The mandate also required him to turn over to the District Court the poll books showing the vote on the franchise matter. This the County Clerk refused to do, and held out in his refusal until a writ of supersedeas was issued by the Supreme Court setting aside the injunction and assigning the case for hearing. The Colorado Telephone Company contends that the election was absolutely void in so far as it related to the granting of a franchise. The ground for this contention is that the city charter provides that municipal franchises shall be voted upon only at a municipal election, asserting that this clause was placed in the charter to preclude the possibility of a questionable franchise being placed before the voters at a general election, with the danger of being carried in the heat of a campaign.

The opposing attorneys claim that even if this were true they would be entitled to a franchise as the proposition was permitted to be printed on the ballot in due legal form and carried at the polls by a majority of the qualified electors.

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IN THE OPERATING FIELD

GROCERS EXPECTED TO TAKE OUT BELL TELEPHONES.

AT Lansing, Mich., twenty local grocers recently signed a resolution which gave expression to their discontent with the service of the Bell Company. It seems that the telephone company still has in use in this place over 650 telephones of the old Blake type. Naturally these instruments do not give the service expected at the present time; and instead of replacing them with modern instruments, which will enable the subscribers to talk, the company is said to be using its long distance apparatus as an excuse for raising rates, as it has done in so many other places. The Retail Grocers' Association decided that united action by its members is the only method of remedying the difficulties of which they complain.

COMPETITION INTRODUCED BY THE BELL COMPANY WHEN THE INDEPENDENTS GET THERE FIRST.

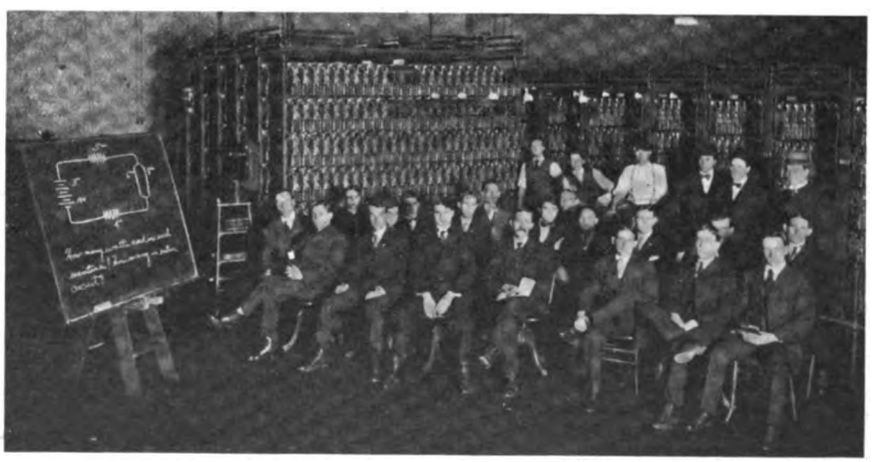
AT Schroon Lake, New York, there has been a well established local company, which recently passed into the control of a larger Independent company at Ticonderoga, the nearest large town in the vicinity. Plans have been made for the immediate reconstruction of the Independent plant, to provide the best possible service for its subscribers, and those who may in the future become connected with its system. In the meantime the Bell Company, which was formerly without connections with this small place, foresaw that if it did not take immediate action it would lose all hope of getting its wires into the town. Immediately after learning that the small concern had been acquired by a strong organization, and that there was consequently no hope of ever controlling the territory by a sub-license arrangement, the Bell company prepared to erect a plant at Schroon Lake as quickly as possible, and build a competing trunk line to Ticonderoga. Doubtless the old verses about competition being duplication will not be sung to the people at Schroon Lake for a few years.

PROGRESS IN TELEPHONE STUDIES IN Y. M. C. A. CLASSES.

THE class in telephony started a few weeks ago by the Columbus Y. M. C. A. educational department, and which recites in the automatic switch room of the Columbus Citizens Telephone Company, is growing more and more interested at each semi-weekly recitation. The class is composed now of twenty-six members, who are taking the first or junior section of the course. Later, when the first half is completed, a new junior class will be started, the present class becoming the senior class. Six, or perhaps nine, months of semi-weekly lessons of two hours each is the period allotted for a full course. This perhaps may be further extended.

The method pursued by the instructors, Mr. Roy Owens, of the Columbus Citizens Telephone Company, and his assistants, is to work out the principles of magnetism, electricity and sound, demonstrate the principles of the telephone transmitter and receiver, and to study first the simplest forms of talking circuits. Then come the simplest circuits of the manual switchboard. The complicated circuits of the modern common battery system follow, and this study is to be carried through local and trunk boards and it will also cover toll and long distance connections. The automatic system is studied by means of circuit drawings and by actual setting up of the apparatus and putting it in operation.

The manual apparatus is loaned by the Central Union Telephone Company and the automatic apparatus is all around the class in busy operation during part of the recitation. The class and instructors are alike enthusiastic and the work is proving wonderfully beneficial.



Y. M. C. A. Class in Telephony Reciting in the Switch-Room of the Columbus Citizens' Telephone Company.

FIRST APPEARANCE OF CANADA'S TELEPHONE JOURNAL.

THE *Telephone Age* of Canada has just brought out its first number in an attractive cover, and with well arranged reading matter. The object of this new journal is to cover the development of Independent telephony in Canada, and it proposes to work in the broad field that is open to it as actively as the men who are now preparing to extend a cheap and efficient service to all parts of the Dominion. Its first number promises well for the fulfillment of its purpose.

CONCRETE TELEPHONE POLES IN INDIANA.

WHAT are claimed to be the first concrete telephone poles ever manufactured in Indiana were made recently by the Richmond Home Telephone Company, of Richmond, Ind. These poles were designed by Superintendent Bailey, as was also the mold in which they are made.

A skeleton frame-work of four corrugated iron rods is covered with ordinary concrete, the material being poured about the frame-work while it is inclosed in the box-like mold. The pole is octagonal in shape, thirty feet long, and is provided with mortises to receive the cross arms and also for the insertion of blocks to assist climbers.

The strong point in favor of the concrete pole, Superintendent Bailey says, is their durability. Wooden poles must be replaced every few years, while concrete poles are expected to last much longer, because soil conditions will not affect them in the least. He also insists that they will cost less than wooden poles, and can be made along the line, thus saving the labor of hauling. It is stated by the maker of these poles that no monopoly can be secured, as a patent would avail little, since a few changes would produce a pole equally as good.

It is the purpose of the Richmond Home Telephone Company to experiment with these poles, and it is now placing them wherever needed, or as fast as the wooden poles become unfit for further use.

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THE EDITOR'S PAGE

COMPETITION INDORSED BY NEW YORK CITY FRANCHISE BOARD'S ENGINEER.

HARRY P. NICHOLS, assistant engineer to the Board of Estimate and Apportionment of New York City, has just presented a report which summarizes the results of an investigation of the conditions prevailing in many cities where telephone competition exists. Although his time was limited, Mr. Nichols seems to have gone into this work earnestly and in a spirit of fairness, and where he was able to obtain the information sought he used it to draw some very valuable conclusions. It is noteworthy that in conducting his inquiries he was able to obtain, in nearly every case, the fullest information from Independent companies, while an examination of the report leads unavoidably to the conclusion that where the information requested would put the Bell companies in an unfavorable light the desired facts were withheld or distorted.

Tracing the results of competition in various localities, there are shown specific instances supporting all the claims of officers of Independent companies who urge that to the existence of competition is primarily due not only the high efficiency of their own systems, but the increased development and improved service of their competitors. Bearing upon this point the following quotations from the report may be cited:

"Throughout the States of Indiana, Ohio and a portion of Kentucky the Independent companies seem to be firmly established. Competition has increased the efficiency of the service of the original company and the number of telephone users. In a number of the cities Independent companies were enabled to gain the foothold they now have because of the poor service furnished by the Bell companies, and in small places by reason of the latter's refusal to establish a plant.

"In the State of Michigan, the Michigan Telephone Company (Bell) was, prior to 1896, the only telephone company operating. This company had not developed the territory, except in the large cities, and at that time furnished poor service. It was owing to this that the Citizens' Telephone Company (Independent) was organized by the citizens of Grand Rapids, and since that time the Independent companies have made rapid growth. Since competition has entered the field the Bell companies have greatly developed the territory; the rates have been reduced and both companies have endeavored to furnish their subscribers with first-class service.

"In St. Louis the unsatisfactory service rendered by the Bell company prior to 1899 led to the organization of the Independent company.

"The situation in Kansas City, Mo. and Kansas, is similar to that of St. Louis. In these cities the plans of the Independent companies are of the best equipment; the service rendered is of the highest order and the number of subscribers has rapidly increased."

Touching further upon this matter in a more general way this report states that

"Previous to the installation and operation of competing telephone systems the Bell companies, many at least, appeared to be extremely indifferent to the matter of development. They confined their operations to cities, and put forth little effort to develop smaller places, unless it was foreseen that good return upon the money invested was to be earned. By reason of this method of procedure the telephone was scarcely known to those outside of cities and large towns. The operation of the Independent companies has changed this attitude of the Bell companies to a great extent. The Independent companies began their operations in small towns and spread to larger cities, until at present in the States of Indiana, Illinois and Michigan and other localities there is scarcely a town which has not an Independent local and long distance telephone. All the principal cities in New York State, with the exception of New York City, have Independent telephone systems, and there are in operation hundreds of farmer lines in the State.

"The effect of competition upon the Bell companies has been to create a new ambition on their part to enlarge and develop their system. The result is that at present both the Bell and the Independent companies are rapidly increasing their number of subscribers.

"This all means that the Independent companies, by their energies to get new business, have inspired the Bell companies to make effort to also increase the number of their subscribers that they may successfully compete with the Independent companies, resulting in an enormous growth, which has been of benefit to all users of the telephone.

"As a rule, representatives of the Bell companies claim that no reductions were made on account of competition, but rather that rates had been reduced from time to time, as the earnings of the company would warrant. Such reductions are also claimed by officers of Bell companies operating in sections where there is little Independent opposition. As an example of this, they cite the New England Telephone and Telegraph Company (Bell), operating in the States of Maine, New Hampshire, Vermont and Massachusetts, in which States there is little opposition. This company has submitted a table showing its changes in rates during the past ten years. In many cases substantial reductions have been made during that time, but it should be noted, reductions in some cities in the territory served by the New England Telephone and Telegraph Company, where there is competition, were made about the time competition began. It is possible that the other reductions made in this territory were made in fear of the competition which has been so vigorously carried on in other places, and which might ensue if high rates were maintained. Notwithstanding the statement which is generally made by the Bell telephone companies' representatives, that competition has had no effect on rates, it is an indisputable fact that the reductions made were put into effect about the time when competition appeared, or was feared, as in New York City, or when the Independent companies gained sufficient strength to become dangerous competitors.

"There are a few cases where Bell rates for toll service have been reduced far below those of the Independent companies; such reductions were made at the time when the Independent companies came into the field, and the Michigan Telephone Company (Bell) operating in the State of Michigan, went into the hands of a receiver after five years of competition, for the reason, it is said, that rates were in many cases reduced below the cost of operation in order to compete with the Independent companies, and as a result the company was unable to pay any interest or dividends upon an excessive outstanding indebtedness.

"Furthermore, a few representatives of the Bell companies have reluctantly admitted that the Independent companies have had the effect of causing such reduction in rates. My own opinion upon this matter is, that the Bell companies have made reductions from time to time because of competition or the fear of it. Even if some of the reductions were made because the earnings of the company were large, I believe the subscribers were more sure of getting this advantage because of competition, as such reductions enabled the Bell companies to more successfully compete with the Independents.

"If the increased earnings of the Bell companies which have enabled them to make the reductions has been caused by a large increase in the number of subscribers, even then the Independent companies have been indirectly the cause of rate reductions, and I have previously shown that the Independent companies have been, in a measure, responsible for the rapid growth in the number of subscribers of the Bell companies."

That the character of the service has undoubtedly been improved as a result of competition is his conclusion, expressed in the following terms:

"Many subscribers state they are in favor of the Independent companies for the reason that competition has caused the Bell companies to give better local service. Previous to the coming of the Independent companies little attention was paid to the complaints of subscribers, little development of the system was attempted and the service rendered was in many places unbearable. Since competition money has been spent freely by the Bell companies to install better apparatus, and better discipline of employees has been maintained, with the result that the standard of efficiency of the service has been raised."

It is evident that Mr. Nichols has given close attention to statements of disinterested persons in cities where competition prevails and consequently has been on the whole favorably impressed with the effects of such competition, and with the many valuable features of the service offered by the Independent companies. In his reference to the capitalization of such companies he shows a lamentable lack of thoroughness, and apparently has allowed himself to be biased by the perverted and misleading reports and indefinite insinuations which are spread so assiduously by officials of the Bell company and by the press bureau which serves their organization. With the companies of the entire country to draw upon for the data which should properly have been secured before drawing conclusions on so important a general subject, Mr Nichols has apparently started with the impression that Independent companies are over capitalized, and attempted to use only such material as appeared to fall in with this prejudice. It must be remembered that this New York engineer must have been repeatedly brought in contact with clever-tongued and able

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officials of the local Bell company who are accustomed to assert that their service is the best, their management the wisest of all, and to utter the remarkable creed that all opposition is based upon principles unsound financially and morally. In the past these statements, made before an audience which included no members with either the knowledge or interest to oppose them, have carried much weight, not necessarily because they are true, but because uncontradicted. Mr. Nichols must have found many things which tended to broaden his knowledge of telephone matters, and overthrow the thoughts which had become so thoroughly fixed in his mind during his earlier education, for he admits in sentences which seem to reveal a considerable measure of surprise:

"I do not mean to say that all Independent companies are overcapitalized, for there are Independent companies which came into the notice of this bureau whose capitalization is extremely conservative, and whose affairs are conducted upon lines which are highly commendable as a public service corporation. Neither do I mean to say that the Bell companies are in all cases free from this evil. No doubt a study of the capitalization of the Bell companies would show excesses by some, at least, in the issue of capital stock or bonds."

After this statement, which shows that he should have realized the importance of using extreme care, Mr. Nichols goes on to make the following direct comparison:

"In Buffalo the Frontier Telephone Company, which is the Independent company operating in that city, is capitalized as follows:

Capital stock	$3,000,000.00
Bonds	2,500,000.00
Total	$5,500,000.00

"Number of telephones as given by the company is 14,000, which makes a total indebtedness against each telephone of about $393.

"The Bell company in Buffalo, operating in all of the northern half of New York State, west of and including Rochester, had on July 7, 1906, 22,044 telephones in Buffalo and in the whole territory 53,977. These figures are given by the representatives of that company. The capitalization of the company is $6,700,000, all in capital stock, or $124 per telephone."

This statement is the only direct comparison between capitali-

LETTER FROM B. G. HUBBELL, PRESIDENT OF THE FRONTIER TELEPHONE COMPANY, TO HARRY P. NICHOLS, SETTING HIM RIGHT ON CAPITALIZATION.

Mr. Harry P. Nichols, Asst. Eng.,
Board of Estimate and Apportionment, New York City.

Buffalo, December 3, 1906.

Dear Sir:—

My attention has been called to your report of November 21st, 1906, to Hon. George B. McClellan, Chairman Board of Estimate and Apportionment, and on page 20 of this report I notice reference to a comparative capitalization between The Frontier Telephone Company of Buffalo, and the Bell Telephone Company of Buffalo.

This report is so misleading in its deductions and so manifestly unfair to the Independent telephone companies that I am constrained to write you on the subject, so that you may correct your comparative statement of these two companies.

In the first place, you have used the authorized instead of the paid in capital of The Frontier Telephone Company as a basis for its cost per telephone, and in the second place you have under-estimated the capitalization issued by the Bell Telephone Company, its capitalization being $7,260,000.00 instead of $6,700,000.00.

I am not informed as to the number of telephones the Bell Company has in this district, but am willing to take your figures as a basis of comparison, namely 53,977 telephones, total, with 22,044 telephones in Buffalo. This would leave 31,933 Bell telephones outside of the city of Buffalo, which, of course, would cost much less than the telephones installed in Buffalo.

It is a well known fact that in small communities, such as covered by the Bell Telephone Company in its rural districts outside of Buffalo, telephone systems can be constructed at $50.00 and not to exceed $75.00 per telephone, and the 31,933 telephones at say $75.00 per telephone, would account for $2,400,000.00 of its capitalization of $7,260,000.00, leaving $4,860,000.00 as the cost of its Buffalo property. You then have 22,044 telephones in Buffalo, with an investment of $4,860,000.00, showing a cost of $221.00 per telephone in Buffalo for the Bell system.

The Frontier Telephone Company has 15,000 telephones in its service in Buffalo, and its total cost does not exceed $2,000,000, which is a cost of only $133.00 per telephone for the Frontier as against $221.00 for the Bell in Buffalo, as compared with your figures of $393.00 for Frontier, against $124.00 for Bell.

Your principal errors in your comparisons are that you do not quote correctly the capitalization of these organizations as it relates to the cost of the property, and in the Bell statement you have put in a vast number of telephones of the cheap farmer line and village construction with which to average down the cost per telephone of its Buffalo system.

As to the capitalization of Independent telephone companies, or other public service corporations, be it either street railway, telegraph, telephone, electric light or others, I maintain that companies so engaged should have an income sufficient to pay 10 per cent. on their cost, after having deducted all operating and maintenance expenses, fixed charges and set aside a sufficient sum of money to provide for depreciation.

It is immaterial to the municipality and the public whether this profit of 10 per cent. shall be derived entirely on a bond issue, with interest at 10 per cent., or whether it shall be on a stock issue at 10 per cent. dividend or whether it shall be on bonds at cost of property at 5 per cent. interest and an equal amount of stock paying 5 per cent. dividend.

Money will earn 5 per cent. without exertion of the owner, and to those who are willing to put their extraordinary efforts and time and encounter the necessary uncertainties accompanying public service corporations, they should certainly be entitled to, and no one should object to their having, at least 10 per cent. on their investment.

The Independent telephone business has grown in a marvelous way in the past six to eight years, and the most remarkable thing about it to my mind is the lack of over capitalization. It has been developed by men who were interested as much from a moral standpoint as from a point of investment, and the Independent telephone enterprises are to-day owned by the most respectable and conservative financial interests in the country, and, contrary to your implied insinuation of promotion profit, there has been so great a lack of such transactions as to make this business noteworthy in that respect.

You can thus readily see you have conveyed a wrong impression in your report and have done our company and the Independent telephone interests generally an injustice.

The Bell company is ever ready to take up comparative statements like yours and, distorting them in every conceivable manner, publish them in all principal papers in the country, in its efforts to discredit the Independent telephone industry, and therefore I trust you will take occasion to set us right before the Board of Estimate and Apportionment in this matter.

Yours truly,

B. G. HUBBELL, *President.*

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zation of a Bell and an Independent company which appears in the report and was made without obtaining the facts and figures which are correct and should have been used. The true condition which should have been brought out is clearly set forth in a letter which was writen by Mr. B. G. Hubbell, the president of the Frontier Telephone Company. This letter we reproduce.

Mr. Hubbell is one of the pioneers in Independent telephone development, and it is doubtful if there is anywhere to be found a man whose opinion on financial matters connected with telephone companies is more worthy of confidence than his. His letter brings out clearly the present standing of the two companies operating in the city of Buffalo. Had Mr. Nichols attempted to make a fair comparison of the capitalization of telephone companies in Western New York he would have found in the territory through which extend the lines of the Buffalo Bell company numerous Independent plants. As the only proper alternative to the basis for comparison limited to the city of Buffalo, as set forth by Mr. Hubbell, he might have worked out a plan for comparing the cost of Independent telephones in this whole territory with the Bell figures. We have secured reliable data which show that half a dozen typical Independent exchanges in this district, with common battery systems and best all-cable construction, and having an average of 361 subscribers, have been built for an average figure of about $64 per telephone—far less than Mr. Hubbell allows as a reasonable capitalization per telephone for the Bell company in the same places. Moreover the figures for Independent companies, both in these small towns and in Buffalo, cover the instruments they use and which they own outright. The Bell company's investment per line, which is much higher, does not cover the instruments, for it not only has no ownership in them, but must pay for their use an annual royalty to the parent company, making them an item of continued expense. It is clear that Mr. Nichols did not go to the Independent companies to obtain his figures on the cost per telephone. Failure to check the information furnished by those who were undoubtedly interested to the utmost in seeing the publication of the conclusions he has drawn, regardless of the facts, has in this particular thing led him into an exhibition of professional weakness which has placed him before the public in a somewhat unfortunate light.

In summing up the results accomplished by Independent companies the report presents only three conclusions of a general character, and these are as follows:

"First—They have, by a vigorous campaign, been the means of creating a new interest in the telephone business, resulting in a great increase in the number of subscribers of both Independent and Bell companies, which has been of great benefit to all users of the telephone.

"Second—They have, by competition, compelled the Bell companies to give better service.

"Third—They have been the direct or indirect cause of reductions in rates of the Bell companies."

No clearer statement of the benefits of competition has ever been produced. Those having the strongest financial concern in the development of Independent properties have never in their enthusiasm made a stronger appeal for public support for a new telephone system than is contained in the summing up of the investigations of this disinterested engineer.

SOME USEFUL APPLICATIONS OF THE PHANTOM CIRCUIT.

(*Continued from page 370.*)

telephone or drop and jack on the wire chief's desk it makes it very handy for testing either line or toward the switchboard. It is not necessary for any electrical reasons to have the test panel circuits shown in Fig. 1, but it is a practical arrangement which makes the work more convenient to handle.

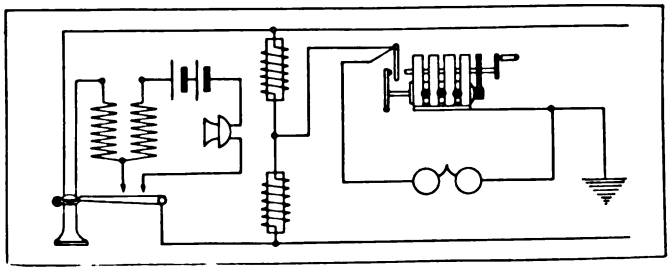

Fig. 3. Arrangement of phantom coil at subscribers' station for signalling in the manner described in Mr. Rounce's article.

Experiments in these methods of duplexing can be carried out at very little expense as every exchange always has a few old bridging bells on hand. The coils will work very well if the iron cores are strapped together, and still better if they are entirely enclosed in soft iron cases. In some instances it may be necessary on account of high resistance of lines to add to the resistance of the phantom coils, making them 2,500 or 3,500 ohms, and it is necessary in any event to see that the coils are carefully balanced before connecting them into the line. While these coils are very useful for signalling purposes on long and heavily loaded lines, they are useless for talking circuits.

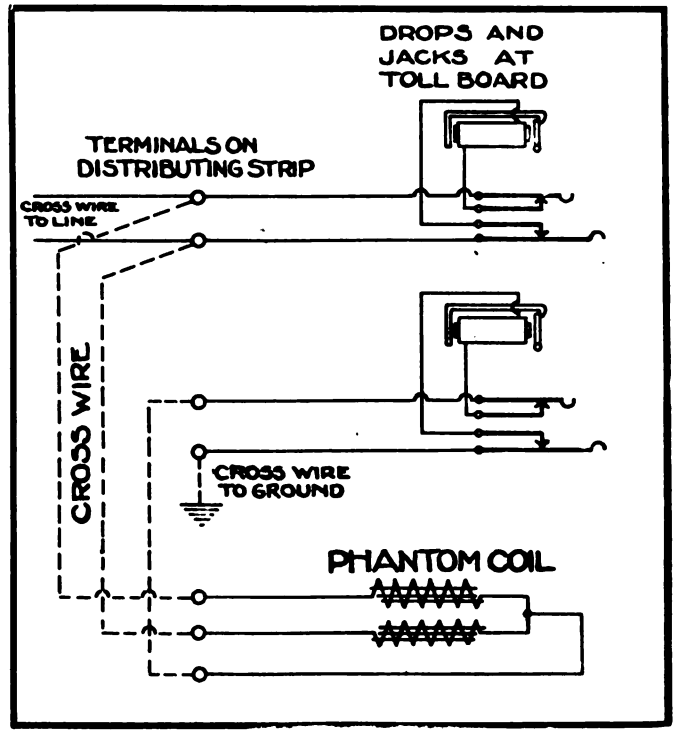

Fig. 4. Arrangement for crosswiring phantom circuit where lines do not enter through test board.

TELEPHONE MISCHIEF.

CHILDREN have found a new way to make use of the telephone to the discomfort of those of their elders who are unable to appreciate a joke. Says a writer in the New York *Sun*: "The longing for some form of daring, adventurous humor, that used to be satisfied by ringing all the doorbells in the neighborhood, is now expressed in quite a different way. The last generation used to manœuvre, between giggles, to get out of doors without the family's knowing. Now strategy is required to get doors closed so that no grown-up shall guess that the telephone is being used. When that is accomplished the lark begins, and just the same number of people lose their tempers in consequence as did years ago, when front door bells were mysteriously rung. The excitement of calling up a random number and when asked 'Who's this?' answering 'Great Cæsar's Ghost,' can never be fully understood by any one over 12 or 14; but to those under that age it is a matter for long and convulsing laughter. Then to call up a teacher—a stern one preferred—and to say in a cold, official voice: 'We are testing the wires. Kindly stand two feet back from the receiver and speak, thank you; now two feet to the right, now the left; thank you; now stand on your head and do it.' This is the tip point of humor. Of course the teacher reproves, and also of course she obeyed their first commands, and the only trouble is that their shouts of laughter are so very likely to bring in the family, agog with questions."

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POSITION WANTED—As Assistant Manager or Superintendent of telephone exchange of two to eight hundred subscribers. Six years' experience, good habits and can give best of reference. Address Box 717, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 717

POSITION WANTED—Young man, age 27, who has exceptional ability as telephone man and manager will be open for re-engagement January 1st. Would like management of an Independent operating company. Have twelve years' experience. Address, Box 731, care THE AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 731

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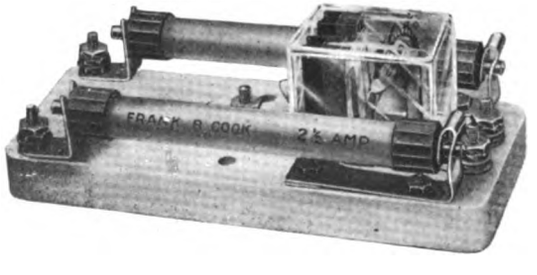

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TELEPHONE PATENTS

PROTECTIVE APPARATUS.

Frank B. Cook, Chicago, Ill., patents (No. 810,914; dated January 30, 1906; filed December 4, 1903; serial No. 183,733) protective apparatus.

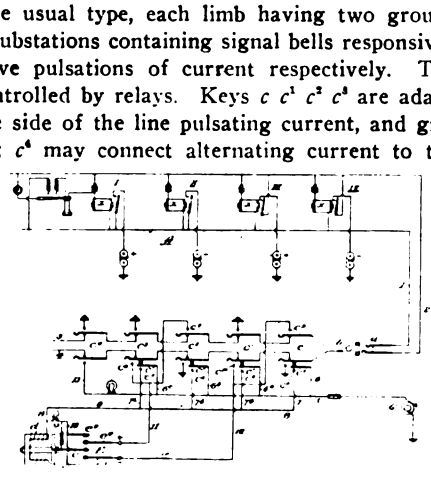
This invention consists of a supporting device for holding lightning arresters and heat coils, provided with suitable contacts, and mounted on a plate which is preferably a part of the iron supporting frame, and conductively connected to ground. In addition to the provisions for grounding lines on the operation of protective apparatus, this patent covers the provision of switch-sockets, adapted to co-operate with a test-plug, and thereby allow the different circuits through the protective apparatus to be tested.

ALTERNATING CURRENT POLE CHANGER CIRCUIT.

Edwin H. Smythe, Chicago, Ill., patents (No. 835,870; dated November 13, 1906; filed February 1, 1906; serial No. 298,917) and assigns to the Western Electric Company, Chicago, Ill., an alternating current pole changer circuit.

This invention covers a circuit for a pole changer for separating an alternating current into positive and negative pulsations. It is intended to be located at a private exchange, so that pulsating ringing may be effected by means of current conveyed from a source at the main exchange over a single wire line, instead of over one having three wires, as has been heretofore customary.

In the illustration is shown a party line, with substation equipment of the usual type, each limb having two ground branches from two substations containing signal bells responsive to positive and negative pulsations of current respectively. The branches may be controlled by relays. Keys c c^1 c^2 c^3 are adapted to connect to one side of the line pulsating current, and ground to the other side; c^4 may connect alternating current to the line. At

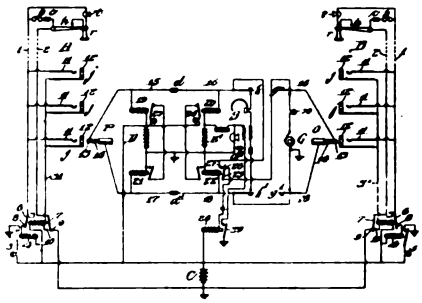


the main exchange is a grounded generator G, which is connected to the apparatus at the branch exchange by a single conductor 5. When any of the ringing keys for pulsating current is operated it connects by means of a local contact this supply lead to wire 8 of the pole changer, the armature of which is caused to vibrate in synchronism with the alternations of the ringing current. This vibration causes the arm e^1 to alternately close contacts e^2 e^4 and e^3 e^5, so that pulsations of one character, for example positive, will be applied to conductor 11, while pulsations of an opposite character, that is of negative polarity, will be applied to conductor 12. A condenser C, which serves to counteract any self induction or reactance in magnet d operates as a synchronizer to maintain the pole changer in time with the alternating current.

TELEPHONE EXCHANGE SYSTEM.

Harry G. Webster, Chicago, Ill., patents No. 835,802; dated November 13, 1906; filed December 16, 1904; serial No. 237,147) and assigns to Milo G. Kellogg, Chicago, Ill., a telephone exchange system.

When a subscriber removes his telephone from the hook, re-



lay 4 is operated, illuminating line lamp 5. Upon the insertion of the answering plug current flows from battery C, through winding of relay 3, jack and plug and winding of relay 21, to the ground side of the battery. This energizes relay 3, and cuts off both sides of the line at 8 and 7, and connects line limb 2 with conductor 31 and the circuit through relay 21. Relay 21 is also energized, closing local circuit of the supervisory lamp 23. Current is supplied to the substation transmitter through relays 19 and 21, which have a resistance of one hundred ohms each, over the strands of the cord circuits and line wires from the jacks. The consequent energization of relay 19 causes the local circuit of supervisory lamp 23 to be opened and remain so until the subscriber hangs up his receiver.

When an operator makes a busy test on a line under normal conditions no noise will be heard in her receiver, because contact piece 13 of the calling plug is connected through test relay 28 to the live side of battery C, with which contact piece 12 is permanently connected. If, however, the line is in use, this contact piece is in circuit with battery through the associated cord relay, and current will flow from battery C, through relay 28, anvil 26, armature 25 of the relay 22 associated with the testing cord, thence through strand 16 and contact piece 13 to the other side of battery, thus energizing relay 28, which short circuits condenser d^2 and produces a click. When the two subscribers are connected, conversation is held through the cord strands by means of the condensers d d^1.

TELEPHONE SYSTEM.

Charles V. Beaver, Anita, Iowa, patents (No. 833,866; dated October 23, 1906; filed August 19, 1904; serial No. 221,429), a telephone system.

The object of this invention is to provide a means for connecting in series any number of lines, whether they be grounded, common return or metallic circuit, without the use of a repeating coil. The inventor outlines a plan whereby such lines may be connected in series, the ground or common return connections at both ends always being attached to the same wire in the metallic circuit. In this way one wire of a metallic circuit is made to act substantially as a return wire, or in other words the metallic line is reduced to the status of the ground or common return line, transmission being substantially effected over one side of the line.

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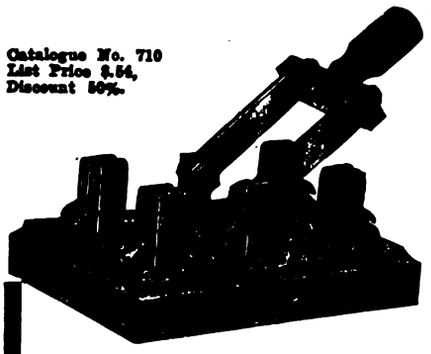

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THE WIRE & TELEPHONE COMPANY OF AMERICA ROME, N.Y.

Talks With The Buyer—No. 2

Yesterday I received a letter which said "Your Talk No. 1 is pretty good "Hot Air," but what I want to know is how can you save me money." From several letters received along this line, I see that collectively you are all "from Missouri"—so am I—shake. I cannot tell you in such limited space even the smallest part of the good things we have to offer you. I will only mention one now.

What kind of wood pins are you buying? If oak, you will admit you need a better one. If Locust, you know the price is awful. We offer you a better pin than either for considerably less cost than Locust. We control the output of mills manufacturing the Bois d'Arc Pins. It is a kind of orange wood. Close grained, tough and with life everlasting.

We can ship you immediately a thousand or a carload out of stock here in St. Louis at $14.50 per M in lots of less than 2,500, to $13.00 per M in lots of 10,000 and over for 1¼ x 8 inch telephone size.

Better send us your order to-day for as many as you can use. Include in the order the rest of the materials you were going to order elsewhere, for we guarantee that no legitimate competitor can undersell us on any item and we can save you money on many items. Your orders will be shipped promptly.

THE SALES MANAGER.

CENTRAL TELEPHONE & ELECTRIC CO., THE UP-TO-DATE TELEPHONE HOUSE 2131-33-35-37 LUCAS AVENUE **ST. LOUIS, MO.**

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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

SCOPE OF CHICAGO ELECTRICAL SHOW.

THERE is every reason to believe that Chicago's second annual electrical show, which is announced for the Coliseum, January 14 to 26, will be the greatest exposition of the kind ever held in the United States, excepting of course the World's Fair exhibits. The show of last January set the pace—it was the most successful trade show ever held in Chicago in points of general interest, attendance and financial results.

Mr. Homer E. Niesz, who has charge of the arrangements for the show, is just now giving much of his attention to the matter of reduced railway rates from points in the middle west and for this purpose it is probable that the contemplated organization of the Allied Electrical Trades Association will be revived. It is proposed to bring the electrical men of all trades together in this association, holding meetings during the exposition, at which topics of general interest will be discussed. Members of the proposed association will not only be eligible for the reduced railway rates, but will also be provided with a ticket to the exposition good throughout the dates of the convention, and will also be given the privileges of the Electrical Trades Club, specially furnished rooms for which are to be provided at the Coliseum.

Telephone manufacturers are taking an unusually strong interest in the coming show owing to the keen rivalry between the Independent and the Bell interests. All telephone exhibitors of last year have taken double the space for the coming show, notably the Chicago Telephone Company, American Telephone & Telegraph Company, the Automatic Electric Company, Swedish-American Telephone Company, Stromberg-Carlson Telephone Manufacturing Company, Kellogg Switchboard & Supply Company, Frank B. Cook, and other firms which manufacture directly or indirectly for the telephone interests.

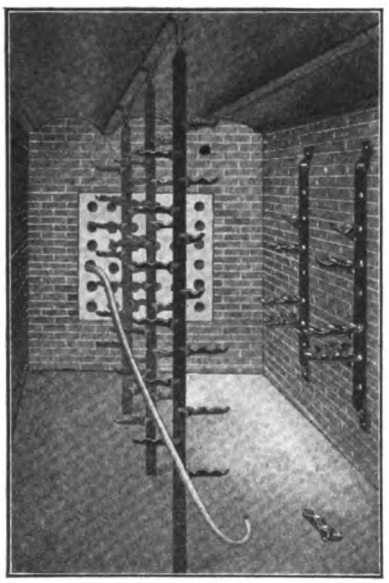
CABLE RACKS.

STRENGTH and convenience are two important features of the Cope Cable Rack, which makes it a very satisfactory fixture for supporting cables in manholes. It is a combination of a vertical supporting bar with arms for retaining the cables. These arms may be readily affixed to the support as required, as in order to secure flexibility in laying out work the supporting bar is drilled with holes to accommodate them. At each of these holes the vertical bar is engaged by a peculiarly shaped clamp at the end of the arm which holds the cable. This supporting end is so shaped that the arm enters the holes from the side of the upright and when it is in place all pressure is exerted against the edge of the upright, thus making a very firm and substantial support with the use of a very small amount of material. The holes for the arms are set four inches apart, making it possible to place a cable support on a level with each duct. The arms are securely locked in position, and cannot become loosened once the cables have been put in their grooves.

The uprights for these cable racks are made of wrought iron of any desired length, in sizes ¼ in. x 1¾ in. and ½ in. x 2 in.

The arms are provided with notches to accommodate different numbers of cables, or may have a rack with a supporting cradle in a form preferred for use with small cables.

The vertical supporting arms may be attached to the brick walls of the man-holes by the use of expansion bolts, or as is shown in the center of the accompanying illustration in which both types are shown, may be set upright in the center of a subway leading from the end of a conduit to the central office. The supporting bars and uprights are made of wrought iron with a japanned finish, but can be furnished of galvanized wrought iron for an advanced price if this style is desired.



Typical Installation of Cope's Patent Cable Racks.

These supports are made in large quantities by T. J. Cope, 3244 North 15th street, Philadelphia, Pa., and are furnished by him to telephone companies at a cost which makes their use economical. The supporting arms are kept constantly in stock and can be shipped promptly whenever needed. Mr. Cope will be pleased to furnish full information and prices to all companies desirous of obtaining material which will provide a cable support of convenient and durable form.

FRANK B. COOK, 238 West Lake street, Chicago, Ill., reports the receipt of many new orders for protective apparatus in several of his well-known lines. For type L distributing frame and switchboard protectors, including the No. 8, No. 10 and No. 14 type, Mr. Cook has received orders from the following: Dean Electric Company for the Statesville Telephone Company, Statesville, N. C.; E. H. Martin Telephone Company, Webster City, Iowa; American Automatic Telephone Company, Rochester, New York; for the Home Telephone Company Exhange, Ironton, Ohio; Sullivan Telephone Company, Sullivan, Indiana; Dean Electric Company for Farmers and Merchants Telephone Company, Odessa, Mo.; National Telephone & Telegraph Company, Wheeling, W. Va.; Citizens Telephone Company, Grand Rapids, Michigan, an addition of 1,000 pairs for main distributing frame; Stromberg-Carlson Telephone Mfg. Co., for the Bristol Telephone Company, Bristol, Tenn.; an addition of 4,800 pairs for the exchange of the Tri-State Telephone & Telegraph Company, Minneapolis, Minn., South Branch; North Electric Company, for Conneaut Telephone Company, Conneaut, Ohio; and an order from the Chicago Electric Protective Company, 147 Fifth avenue, Chicago, Illinois.

For subscribers' station protectors, either types B-4, B-5 or B-6, the following orders have been received: Wabash Valley Telephone Company, Paris, Illinois; Citizens Independent Telephone Company, Terre Haute, Ind.; Brockport Telephone Company, Brockport, New York; United Telephone & Telegraph Company, Philadelphia, Pa.; Independent Telephone Company, Council Bluffs, Iowa; Peoples Telephone Company, Superior, Wis.; Georgia Telephone & Telegraph Company, Savannah, Ga.

Mr. Cook has also received a great many large orders for his self-welding wire joints, universal guy clamps and Cook clips. Prices and description of any or all of these types of apparatus will be cheerfully furnished by him on receipt of an application.

THE AUTOMATIC ELECTRIC COMPANY, Chicago, Ill., has prepared a four-page folder dealing with "The Question of Operators." The company cites in proof of points which are clearly set forth in the folder two interesting clippings taken from newspapers in different sections of the country. These tell one of the principal reasons for bad service in the cities in which the papers were printed, and the Automatic Electric Company wishes to

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Is Your Stock Paying Dividends?

IF NOT, GET A

CALCULAGRAPH

and increase the revenue from your toll messages.

The overtime charges that are not recorded by the old method of timing amount to a large sum in the course of a year.

The Calculagraph

MAKES NO CLERICAL ERRORS

WRITE FOR CATALOGUE

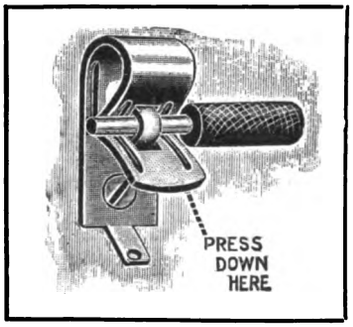
CALCULAGRAPH CO.

1437 Jewelers' Building **New York City**

Agents for Canada: Northern Electric and Manufacturing Co., Montreal.

YOU want what you want when you want it. Therefore when your dealer wants to sell you dry batteries fitted with screw posts, say "No! I want

FAHNESTOCK SPRING BINDING POSTS



on all my dry batteries." Why you want them is none of the dealer's business. But you know why. You know they save time and endless troubles. Because they're quickly connected, make a perfect connection, do not get dirty nor corrode, and the connecting wire will not become broken.

They're also being used in numberless other places in the up-to-date exchange and are supplied by the up-to-date manufacturer on distributing boards, lightning arresters, etc.

A Sample and Style Book sent on request.

FAHNESTOCK ELECTRIC CO.

129 Patchen Avenue **Brooklyn, N. Y.**

Cope's Patent Cable Rack and Conduit Rods

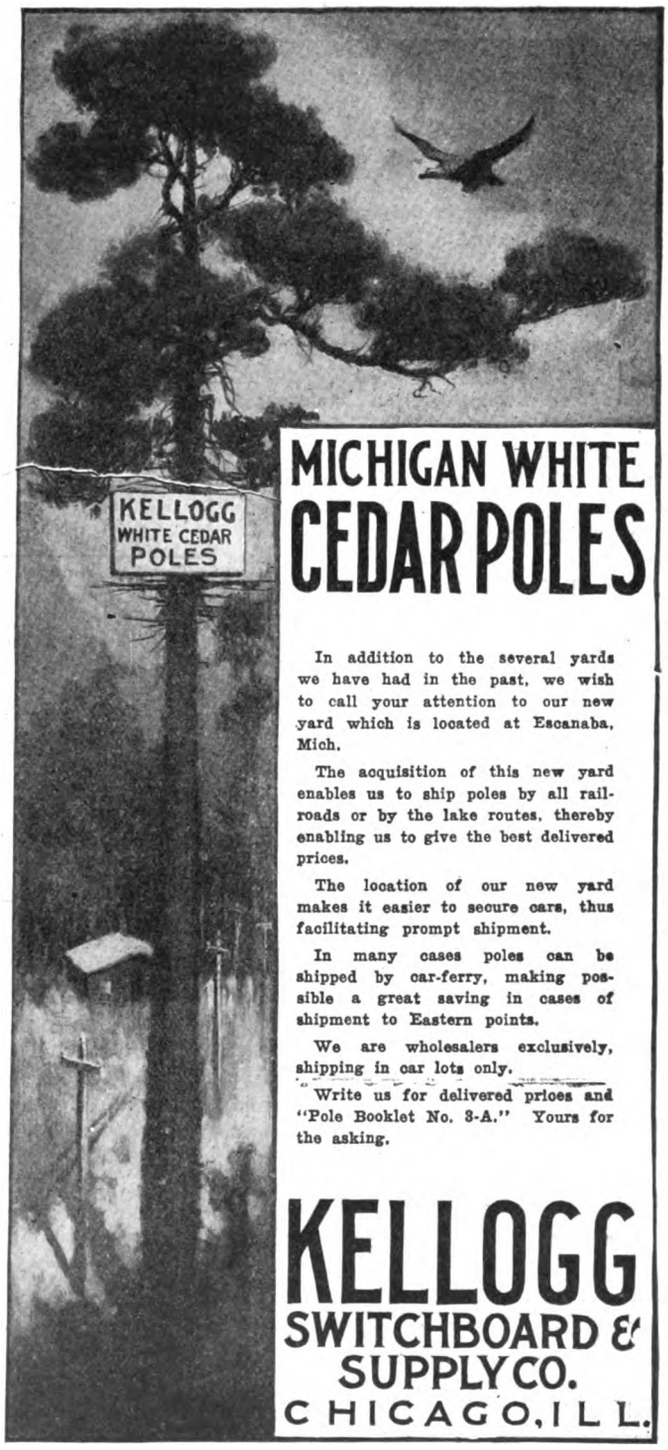
FOR MANHOLES, VAULTS AND DUCTS.

Cheapest, strongest and most convenient CABLE RACK made. Costs but little more than wood and is indestructible, more durable and convenient.

CONDUIT RODS are made in 3 and 4 foot lengths. Quickly coupled and uncoupled, they are the best rod on the market.

T. J. COPE *ENGINEER AND CONTRACTOR*
3244 NORTH 15th ST., PHILADELPHIA, PA.

Manufacturer of all tools appertaining to Underground Construction
Write for catalogue describing Cope specialties.



MICHIGAN WHITE CEDAR POLES

In addition to the several yards we have had in the past, we wish to call your attention to our new yard which is located at Escanaba, Mich.

The acquisition of this new yard enables us to ship poles by all railroads or by the lake routes, thereby enabling us to give the best delivered prices.

The location of our new yard makes it easier to secure cars, thus facilitating prompt shipment.

In many cases poles can be shipped by car-ferry, making possible a great saving in cases of shipment to Eastern points.

We are wholesalers exclusively, shipping in car lots only.

Write us for delivered prices and "Pole Booklet No. 3-A." Yours for the asking.

KELLOGG SWITCHBOARD & SUPPLY CO.

CHICAGO, ILL.

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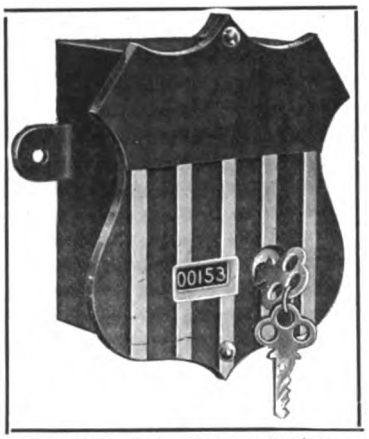
draw the attention of telephone managers to its plan for remedying these conditions.

SHIELD REGISTERS FOR MEASURED SERVICE.

OWING to the adoption of the Shield by the Independent telephone companies, as their standard emblem, the Gray Telephone Pay Station Co., of Hartford, Conn., quite recently designed and placed upon the market a pay station coin collector in the shape of a shield, finished in red, white and blue.

These pay stations being distinctive of the Independent service, their sales have been large. The Gray company now comes to the front again with a measured service register. This also is in the shape and color corresponding to the emblem of the Independents.

This register can be used on any ordinary wall or desk telephone of either common battery or magneto type, and in operation is entirely mechanical. It is intended for service on either private or party lines. Where it is installed the subscriber calls in the usual way and when the connection is made the operator requests the signal. With the turn of the key by the subscriber the signal is sounded and the counter actuated. The user has at all times before him an accurate statement of the service and at certain periods the account is taken from this register in the same manner as with gas or water meters.



The New Gray Message Register.

Where measured service is given, especially in the residential districts, this device is likely to meet with much favor. Design patents on this register have been obtained by the Gray company.

THE F. BISSELL COMPANY, Toledo, O., manufacturers of the well-known line of "Security" telephone construction specialties, is not in the least lacking in point of advertising. In connection with the distribution of the new directory issued last month by the Toledo Home Telephone Company, the Bissell people inserted a circular on electrical household devices, the folder being amply illustrated. With the circular the company enclosed a "number" card for each telephone, a copy of which is reproduced herewith.

THE EDWARDS-HINE CO., 5 and 7 Pearl street, Grand Rapids, Michigan, has recently sent out a very attractive folder showing the essential features of its Proudfit Junior, a stock ledger outfit. This consists of a current binder bound in Russia and corduroy with leather corners and a leather label, and a transfer binder bound in full canvas, with ruled paper and index tabs. This binder is constructed on the same principle as the regular Proudfit binder, having the same features which has made this so favorably known. It can be opened flat and presents an appearance similar to that of a regular bound book, while it secures all the advantages of the loose leaf system. A widely varying number of sheets, from seventy-five to three hundred and fifty, may be held without in any way injuring the appearance or convenience of the book. The company will be pleased to send full information to all persons interested.

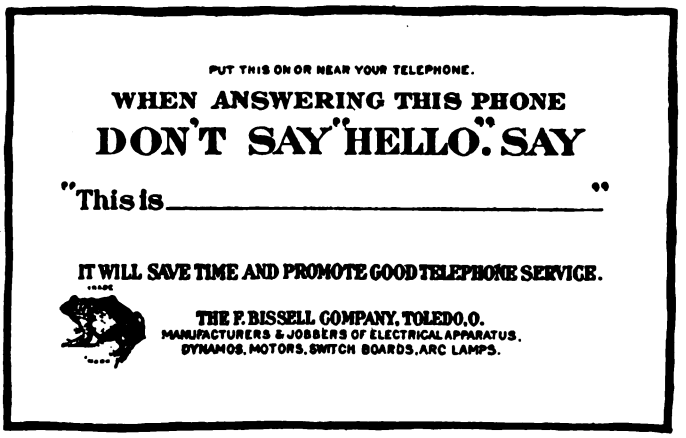
THE AMERICAN SCHOOL OF CORRESPONDENCE, Chicago, Ill., is calling attention to a special Christmas offer of its Cyclopedia of Engineering. This well-known set of books will be furnished at half price by the school until Christmas. The school will send full particulars of this exceptionally attractive special offer to all persons who are interested.

THE LONG DISTANCE TELEPHONE MANFACTURING COMPANY, South Bend, Ind., has recently opened a branch office at 220 California avenue, Oklahoma City. Charles A. Davidson has gone to the new office as manager, and will be in charge of this branch. A full line of telephone supplies will be carried, but special arrangements have been made for promptly supplying all material needed for the construction of rural telephone systems.

THE CENTURY TELEPHONE CONSTRUCTION COMPANY, Buffalo, N. Y., has recently purchased the large plant of the General Railway Signal Company at a cost of $250,000. It will take possession of the plant about March 1st, and it is expected that under the new management its product will be of a nature to attract considerable attention from the telephone trade.

THE SWEDISH-AMERICAN TELEPHONE COMPANY, Chicago, Ill., has just put upon the market a new switchboard feature which has several points of special merit. In the company's advertisement in the present issue is shown a self-contained self-restoring drop and jack, which can be removed from the switchboard as a unit by the simple unscrewing of two nuts as shown in the illustration. Illustrations of the method of removing drops and coils are also shown. The coil can be taken out of any drop in the switchboard, and this can be accomplished from the front without in any way disturbing any other part of the board. The only operation necessary is to release the small spring shown on top of the coil tube, beneath the armature hook. This spring has no electrical connections, and is only used for holding the coil in place. When the coil is removed it does not interfere in any way with any connections or parts except the two coil contacts on its own rear end. It is impossible to return a coil to place without making good permanent contact. All chances of leakage or poor contacts are said to be entirely eliminated by the form of construction. The drop shutter is mounted on the end of the core.

The advantages of being able to remove a drop coil instantly are apparent to all telephone men, and the Swedish-American Company expects that its solution of the problems involved in the design of such a drop will win the approval of operating men familiar with practical conditions.


PUT THIS ON OR NEAR YOUR TELEPHONE.
WHEN ANSWERING THIS PHONE
DON'T SAY "HELLO." SAY
"This is _____"
IT WILL SAVE TIME AND PROMOTE GOOD TELEPHONE SERVICE.
THE F. BISSELL COMPANY, TOLEDO, O.
MANUFACTURERS & JOBBERS OF ELECTRICAL APPARATUS.
DYNAMOS, MOTORS, SWITCH BOARDS, ARC LAMPS.
Card Sent to Subscribers of the Toledo Home Telephone Company in Directories by the F. Bissell Company.

THE ROCHESTER, SYRACUSE AND EASTERN R. R. Co., Syracuse, N. Y., is advertising on another page of this issue the sale of a quantity of new telephone cable. This is now located at Newark, N. J., and has never been removed from the reel. The company claims it offers an unusually good purchasing opportunity.

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¶ Ask Morgan to tell you the Long Distance story. A new way to reduce cost of maintenance and some other interesting things. He is at the Old South Building, Boston, Mass.

¶ J. G. Morgan, Representative for the Eastern States and Treasurer of the Peoples Telephone Co., Exeter, N. H.

¶ We are INDEPENDENT. You can't buy our stock for any amount of money, neither can the Bell company. How many of our competitors can say this?

LONG DISTANCE TELEPHONE MFG. CO.

SOUTH BEND, IND.

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THE WEEK'S MESSAGES

NEW COMPANIES.

SYLVESTER, GA.—Application for a charter for the Sylvester Telephone and Telegraph Company was filed with the Secretary of State. The company is capitalized at $2,500. The incorporators are T. A. Spurlin, Josephine P. Spurlin, J. G. McPhaul, J. S. Westberry, Edna Spurlin, of Worth County, and Edna Spurlin, of Tift County. The headquarters of the company are at Sylvester, Worth County.

MASON CITY, ILL.—The Mason City Telephone & Telegraph Company has been incorporated with a capital of $2,500. The incorporators are W. A. Grandy, J. F. Culp and H. F. Reason.

CHICKASHA, I. T.—An Independent telephone company is being organized at this place. It is proposed to ask the city council for a franchise and to put in the most up-to-date system obtainable, with underground cables.

LIBERTY, KY.—The Scottsville and Liberty Telephone Company, of Allen County, has been incorporated with a capital stock of $160. The incorporators are E. H. and D. N. Reynolds and J. W. Whitlow, of Scottsville.

FRANKFORT, KY.—The Shelby County Telephone Company, of Shelby County has filed articles of incorporation with a capital stock of $120,000, with the following incorporators: W. J. and B. A. Thomas, E. J. Doss and J. C. Burnett, of Shelbyville; J. W. O'Bannon, John A. Crabb, W. S. Wilson, of Eminence, and W. W. Turner and E. H. and L. K. Smith, of Newcastle.

SHREWSBURY, MASS.—A new telephone company, to be known as the Moonlight Telephone Company, has been organized at Shrewsbury. Among those interested in the new enterprise are L. E. Gates and F. S. Child.

NORTHFIELD, MINN.—Articles of incorporation have been filed by the Northfield Telephone Company. The capital stock has been placed at $25,000, and the incorporators are William Ebel, D. D. Turner and A. L. Dixson.

CARROLL, NEB.—A new telephone company has been organized at Carroll to incorporate at $10,000. The officers are John Heeren, president; John Shannon, vice-president; J. W. Johnson, secretary, and R. D. Merrill, treasurer.

RENFREW, PA.—The Pennsylvania Telephone Company has been organized with the following directors: T. G. Kennedy, W. Marks, L. S. Reilly, Dr. Campbell and F. T. Niggell. W. J. Burton has been elected president. It is the intention of the new company to construct a line between Renfrew and Mars.

BRENHAM, TEX.—A company is being formed to build a telephone line from Wehdem, Austin County, to Brenham.

WILSON CREEK, WASH.—The Wilson Creek Telephone Company, with a capital stock of $2,500, is to file articles of incorporation.

BUENA VISTA, WIS.—The Valley Telephone Company of Buena Vista, Portage County, has been incorporated with a capital stock of $1,000. The incorporators are D. F. Gates, L. E. Wentworth, H. H. Rood and J. W. Boursier.

FRANCHISES.

FULTON, ILL.—The Fulton Mutual Telephone Company has been granted a franchise at Fulton.

FREMONT, IA.—A franchise has been granted to the Farmers & Traders' Telephone Company.

NEWPORT, KY.—Bids are requested for a telephone franchise in Newport under the ordinance recently adopted, which invited telephone bids.

MIDDLEBORO, MASS.—The Home Automatic Telephone Company has petitioned the board of selectmen to grant them a franchise to construct and operate a plant in this town.

PAPILLION, NEB.—The Sarpy Mutual Telephone Company will ask the village board of Papillion for a franchise identical with the one granted the Home Telephone Company.

FAYETTEVILLE, N. C.—The Carolina Telephone & Telegraph Company has been granted a franchise to construct a system in Fayetteville.

PALESTINE, TEX.—An ordinance has been passed to grant a franchise to the Palestine Telephone Company to maintain, operate and extend a telephone system in the city of Palestine.

HOQUIAM, WASH.—The City Council of Hoquiam has granted a telephone franchise to E. C. Finch.

KEYSER, W. VA.—The City Council of Keyser has granted a franchise to construct a telephone system in this town. The lines of the new company will be spread out in Mineral and Grant counties particularly. Among the local promoters of the new telephone line are C. W. Siever, H. I. Welsh, James W. Carskadon, S. L. Twigg, V. M. Alkire, J. W. Wagoner, O. A. Hood and A. A. Welton.

FINANCIAL.

ALTAMONT, ILL.—The Effingham County Telephone Company of Altamont has increased its capital stock from $6,000 to $8,000.

ATWOOD, ILL.—The Atwood Mutual Telephone Company is considering the advisability of increasing its capital stock.

LAFAYETTE, IND.—The Lafayette Telephone Company has awarded a $65,000 contract for a new switchboard and complete telephone system to the Sterling Electric Company of this city. The company also recently awarded a $15,000 contract for underground conduits to W. H. Crumb & Co.

ST. JOSEPH, MO.—The capital stock of the Citizens' Telephone Company has been increased from $150,000 to $1,000,000.

SEWARD, NEB.—It is the intention of the Seward County Telephone Company to increase its capital stock from $50,000 to $100,000.

CHIPPEWA FALLS, WIS.—At a meeting of the stockholders of the Chippewa County Telephone Company a cash dividend of 7 per cent. was declared.

COMBINATIONS.

ELLISVILLE, ILL.—The Mutual Union Telephone Company has purchased the North Fulton Telephone Company, which has a toll line from Ellisville to Lewistown, and also own franchises for exchanges at Cuba and Lewistown. The North Fulton Company also has an exchange in Canton, and it is the intention of the Mutual Union Company to enter into active competition with the Bell Company, which has heretofore had a monopoly in this section.

VERSAILLES, MO.—The telephone exchange at Versailles, formerly owned by John Brokmeyer, has passed into the hands of Dresle Bros. of Kansas City, the purchase price being $12,500.

DALLAS, TEXAS.—The Dallas Consolidated Long Distance Telephone Company has been purchased for $8,000 by G. W. Riddle and others. It is the intention of the new owners to extend the system.

PLAINFIELD, WIS.—The stock of the Union Telephone Company has been acquired by the Almond Telephone Company.

ELECTIONS.

DAYTON, IA.—The Dayton Mutual Telephone Company, recently incorporated, has elected the following directors: E. M. Lundien, H. E. Nelson, Charles Pearson, S. A. Burnquist and J. W. Greene.

BRYAN, O.—At the annual stockholders' meeting of the Bryan Telephone Company the following directors were elected for the succeeding three years: J. A. Devore, E. B. Willett and C. S. Roe.

JOHNSTOWN, PA.—The Salix Telephone Company has changed its name to the Windber Telephone Company, and has elected the following officers and directors: President, Charles R. Glock, Johnstown; vice-president, H. A. Kinney, Windber; treasurer, G. A. Smith, Windber; manager, R. L. Sproat, Windber; directors, C. R. Glock, C. W. Hoyer, M. P. Boyle and W. R. Foster, Johnstown, and J. D. Shaffer, G. A. Smith, H. A. Kinkard and W. L. Heisel, of Windber.

CHIPPEWA FALLS, WIS.—The Chippewa County Telephone Company has elected the following officers: Lem Richardson, Eagle Point, president; Joseph Maloney, Bloomer, vice-president; H. V. Bartlett, Eagle Point, secretary and manager; Charles H. Liehe, Eagleton, treasurer; S. B. Nimmons, S. Fletcher and A. J. Edminster, directors.

NEWS—WANTED

THE matter contained upon the message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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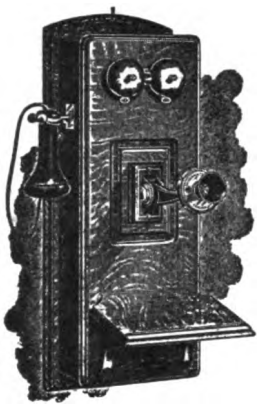

Our Price is Right

1st

TELEPHONE MADE

with all connecting wires, binding posts and terminal screws fully concealed

To Prevent Trouble

and with no exposed metal parts in the circuit to

Avoid Danger

from lightning while using the instrument. Send us your inquiry and we will "SHOW-U" at our expense an interesting proposition.

INTERNATIONAL TEL. MFG. CO.
Harrison and Clinton Sts., Chicago

Locust Pins in Toledo

stock for quick shipment at right prices. Get our figures on genuine Locust before buying some other kind which will rot quickly. Locust lasts.

TOLEDO, OHIO · THE F. BISSELL COMPANY

THE F. BISSELL COMPANY.
TOLEDO, O.

The Best Combinations at the Lowest Prices

SPECIAL OFFERS

	Regular Price per Year.	Our Price to You.
Cosmopolitan	$1.00	
World To-Day	1.50	
American Telephone Journal	1.00	
Total	$3.50	$2.30

These three must go to the same address.

Cosmopolitan	$1.00	
American Telephone Journal	1.00	
Total	$2.00	$1.65

World To-Day	$1.50	
American Telephone Journal	1.00	
Total	$2.50	$1.75

Outing Magazine	$3.00	
Ainslee's Magazine	1.50	
World To-Day	1.50	
American Telephone Journal	1.00	
Total	$7.00	$4.25

American Boy	$1.00	
American Telephone Journal	1.00	
Total	$2.00	$1.60

American Magazine	$1.00	
American Telephone Journal	1.00	
Total	$2.00	$1.65

Pictorial Review	$1.00	
American Telephone Journal	1.00	
Total	$2.00	$1.55

Harper's Bazaar	$1.00	
American Telephone Journal	1.00	
Total	$2.00	$1.75

Lippincott's Magazine	$2.50	
American Telephone Journal	1.00	
Total	$3.50	$2.50

If you want some other Magazine with The American Telephone Journal send list and will quote you prices with pleasure.

Address National American Telephone Journal Club List, Cattaraugus, N. Y.

EVERY COIL

of **Roebling Double Galvanized Telephone Wire** bears a tin tag and lead seal upon which the word "**Roebling**" is stamped.

Don't accept Wire without the **Roebling Seal.**

JOHN A. ROEBLING'S SONS CO., - TRENTON, N. J.

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THE WEEK'S MESSAGES

MISCELLANEOUS.

ABILENE, TEXAS.—The Roberts Telephone & Electric Company, of Abilene, Texas, continues to make extensions and improvements. It now has ordered and has in transit the material for the erection of a 40-mile toll line, 1½ circuits No. 12 iron, between Abilene and Stamford, along the right of way of the Abilene & Northern Railroad and will add other circuits when necessary. It hopes shortly after the first of the year to have this line completed and ready for business.

BENTON, ILL.—The Stamper Union Telephone Company has leased its system in Franklin County to the Ohio & Mississippi Valley Telephone Company for a period of five years, with the privilege of buying.

BENTON HARBOR, MICH.—The franchise for an Independent telephone system, which is said to have the backing of the Stromberg-Carlson Telephone Manufacturing Company, is for a company which will be known as the Lake Shore Telephone Company.

SCOTT, O.—James W. Miller, former superintendent of the Van Wert Home Telephone Company, and Frank Miller have purchased the local exchange at Scott, consisting of about one hundred and fifty telephones. They will make a number of improvements and expect to increase the exchange to two hundred telephones.

SAN ANTONIO, TEXAS.—Upon the completion of the Government telephone system at San Antonio and Fort Sam Houston the work of installing a system at Fort Bliss and Fort Clark will be commenced.

PERSONAL.

A. R. PARDINGTON, who, as the head of the contract department of the Long Island division of the New York and New Jersey Telephone Company, was actively concerned in the development of the company's business to its present large proportions, has resigned to accept the position of second vice-president and general manager of the Long Island Motor Parkway, incorporated. Mr. Pardington's active interest in automobile affairs has become widely known to telephone men through his development of the telephone system used in connection with the Vanderbilt Cup Races. In his present position he will have charge of the building of the great Parkway which is to be built on Long Island.

H. E. PEMBERTON, who is wire chief of the Texarkana Telephone Company at Texarkana, Texas, recently had the misfortune to come in contact with a telephone wire which was crossed with a 2,300 volt electric light circuit. His left hand and both feet were badly burned and a day or two later it was necessary to amputate his left arm between the elbow and wrist. Mr. Pemberton has many friends through the States of Illinois and Missouri as well as near his present headquarters, who will be pleased to learn that in spite of the seriousness of his injury he will recover.

New Construction in the Field

LONG BEACH, CAL.—Additional switchboards are to be installed by the Union Home Telephone Company at the Long Beach exchange.

LOS ANGELES, CAL.—The new building that is being erected by the Home Telephone Company is expected to be completed by January 1. The building will have sufficient capacity to serve 10,000 subscribers.

SAND POINT, IDAHO.—General Manager Fisher of the Interstate Telephone Company has arranged for the expenditure of several thousand dollars in improvements. Open wires in the city will be changed to cables and a new switchboard will be installed in the central office later on. The company, expects to move to larger quarters in a new building.

GARDEN PRAIRIE, ILL.—The Boone County Telephone Company is about to make changes in its open wire lines.

HIGHLAND, ILL.—The Farmers' Telephone Company is building a new line at Highland.

HUNTINGBURG, IND.—The Dubois County Telephone Company has completed a No. 10 standard copper line from Huntingburg to Princeton, a distance of 47 miles. This line affords the Independents of this territory a direct outlet to Louisville. Heretofore this and other southern points were reached only via Indianapolis.

MASON CITY, IA.—It is the intention of the Western Electric Telephone Company to spend $60,000 in the improvement of its system.

ROCKWELL CITY, IA.—Many improvements are being made by the Central Mutual Telephone Company in its plant.

BUSHTON, KAS.—The lines of the Bushton Telephone Company are being extended.

ASHFIELD, MASS.—The Heath Telephone Company of Heath, Mass., is preparing to extend its rural lines in this vicinity.

JACKSON CITY, MICH.—Owing to the advance in rates by the Michigan State Telephone Company, the Michigan United Railways Company is considering the advisability of installing a private exchange and line.

SUN RIVER, MONT.—The Reclamation Service proposes to construct a line from Sun River to Fort Shaw and other points, in all a distance of about forty miles.

BEATRICE, NEB.—The New Home Telephone Company is about to install a number of additional local lines.

OMAHA, NEB.—The contract for the construction of the plant of the newly incorporated Independent telephone company, which was granted a franchise at the recent election to operate in Omaha, was given to the Crescent Construction Company, of Portland, Oregon. The cost of the plant is estimated at $1,500,000, and it is expected to be in operation inside of a year.

ST. PAUL, NEB.—A meeting will be held at Boelus of well-known farmers to complete plans for a telephone system in that locality.

CAMBRIDGE, N. Y.—The Granville Telephone Company of Granville, New York, is extending a line through Ash Grove.

EAST HOMER, N. Y.—New lines are to be built by the Inter-Ocean Telephone Company.

ELLENVILLE, N. Y.—A new telephone line is under course of construction by H. S. Wells.

ORISKANY, FALLS, N. Y.—The local telephone system is making extensive extensions in this vicinity.

WILLOW POINT, N. Y.—The Willow Point Telephone Company will extend its present line to Binghamton.

GLOUSTER, O.—The Sunday Creek Company is establishing a complete private telephone system among all its mines and company stores in the Hocking and Sunday Creek Valleys. The system will embrace all the holdings of the company in the entire State. The principal office is now located at Glouster, but it is the intention of the company to establish a new central at Athens.

NORTH JACKSON, O.—The North Jackson Telephone Company is extending its lines.

MERIDIAN, OKLA.—Mr. E. P. Wilkerson, of Mulhall, the owner of the rural telephone system in that vicinity, has contracted to have telephones installed and a switchboard up by January 15th in Meridian.

INDIANA, PA.—The Farmers' Telephone Company will string a new line between Greenville and Dixonville.

KUTZTOWN, PA.—The Kutztown Rural Telephone & Telegraph Company is building a line from Kempton to Trekler, Wanamaker and Jacksonville, and places further north. It will also extend its lines in this town.

RIDGWAY, PA.—Additional lines are being constructed by the Commercial Union Telephone Company at Ridgway.

WESLEY, PA.—The Venango Telephone Company, recently incorporated, expects to extend its lines from Centretown to Millbrook, Clintonville and Harrisville.

GROTON, S. D.—The Groton Farmers' Telephone Company is building a line from Bath to Aberdeen.

PALESTINE, TEXAS.—It is the intention of the Palestine Telephone Exchange to spend $20,000 in improving its system. The management expects to install a switchboard capable of operating over 2,000 telephones and to extend its wires to every part of Anderson County.

PORT ARTHUR, TEXAS.—The exchange of the Texas Telephone Company is being rebuilt, and the company contemplates many other improvements in its system.

PULASKI, TENN.—The Local Telephone Company, recently organized by the citizens of Westmoreland, are putting up poles and wires.

BURNT HOUSE, W. VA.—The Pritchard Telephone Company is extending its line to this place.

WATERVILLE, WASH.—The recently incorporated Farmers' United Telephone and Telegraph Company contemplates the erection of a line northwest and north from Coulee City, which will cover about 100 miles of territory. The new line is to enter the towns of St. Andrews, Jean, Mansfield, Bridgeport, Mold and Leahy.

WHEELING, W. VA.—The National Telephone Company expects to establish a system in Steubenville which will necessitate the expenditure of about $80,000. Work on the plant will begin very soon.

MILWAUKEE, WIS.—The Milwaukee Independent Telephone Company, which was recently granted a franchise at Milwaukee, contemplates the erection of a plant which will cost in the neighborhood of $2,500,000, and will serve about 20,000 subscribers.

UNDERGROUND.

PETERSBURG, W. VA.—It is the intention of the Petersburg Telephone Company to spend $10,000 on its underground work at Petersburg.

BENTON HARBOR, MICH.—The wires of the Twin City Telephone Company are to be placed underground in the business section of Benton Harbor.

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VOLUME XIV. SATURDAY, DECEMBER 15, 1906. NUMBER 24

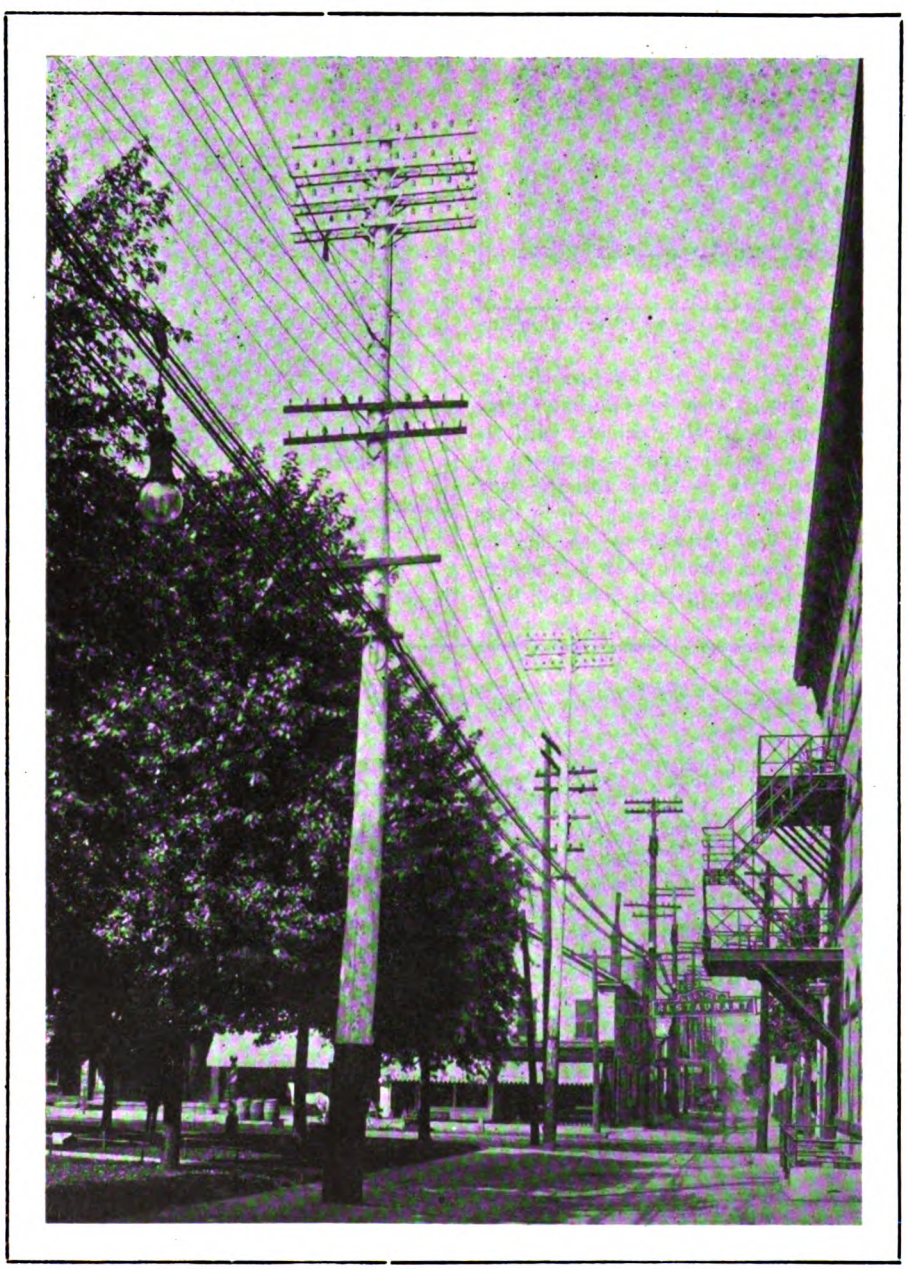
A Modern Independent County Telephone Company*

By Charles Wilkins.

RURAL lines of the Tuscarawas County Telephone Company are all built according to specifications which insure strong and thoroughly permanent construction. Thirty foot poles with 6-inch tops are used, with double cross arms on all corners. Corners are guyed with ⅜ nessenger wire to a ½-inch anchor rod attached to a slug set from 6 to 8 feet in the ground. No. 12 B. B. telephone wire is used in the country, but from the corporation limits nothing but copper is used, on account of the sulphur conditions. In the country chestnut is used quite extensively for poles, while all lines in towns are run on cedar poles ranging from 45 to 60 feet in height. The country lines are on the top cross arms of poles in the city, and are run overhead all the way to the central office, thus doing away with any danger of injuring the efficiency of transmission by the introduction of cable.

Central office protection of the usual heat coil and carbon arrester type is provided.

Rural lines are 10-party lines equipped with a divided circuit, direct current generator. The ringing of 5 parties on each side of the line is controlled by a master key at the central office. A special number scheme is used for these lines and has been found to be very satisfactory. This plan may be explained as follows: Suppose a line is terminated on drop No. 270 and the master key at the office turned from the operator connects generator to the tip side of the line. The subscribers on this side of the line number from 1 to 5. Their numbers will appear in the telephone directory as 2701 to 2705, using the last figure on the number for the number of rings. Therefore, if the operator were to receive a call for 2702 she would push the master key from her, connecting ringing circuit to the tip side of the line, and ring twice. The master key pulled to the operator is for the sleeve side of the line. Subscribers on this side have numbers, for example, from 2706 to 2710. The operator receiving a call for 2708 subtracts 5 from the last figure, which indicates 3 rings.



High Grade Aerial Cable Construction. Main Leads West from New Philadelphia Central Office, Formerly Open Wire.

The cable boxes in use are the Hall boxes made by the Mountain State Electric Co., Wheeling, W. Va. The capacity of these boxes ranges from 10 to 50 pairs, according to conditions. Toll lines and country lines are provided with the

(*Continued from the issue of Dec. 8th.)

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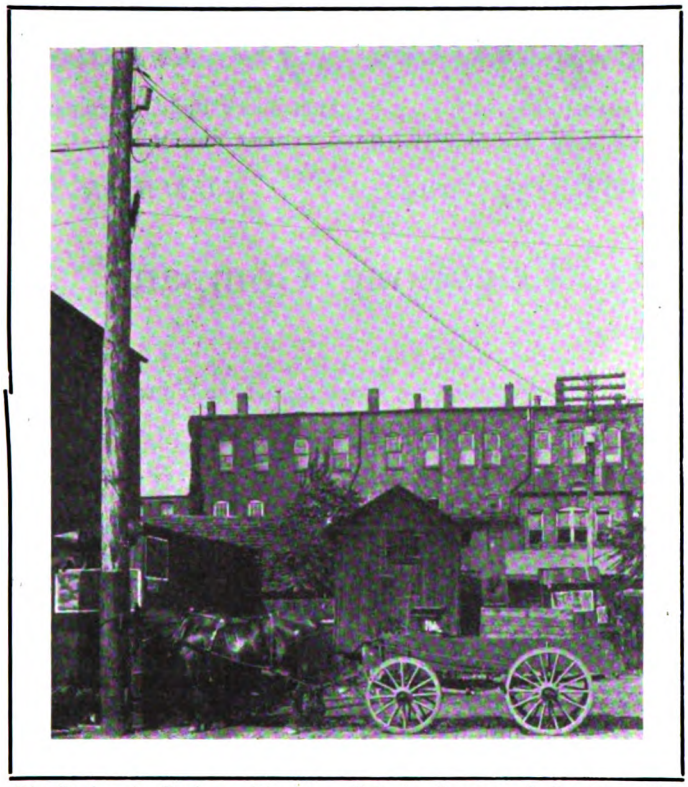
Berry arresters made at Marion, Ohio. These have given good satisfaction, as there is no chance for the lines to become grounded after a storm.

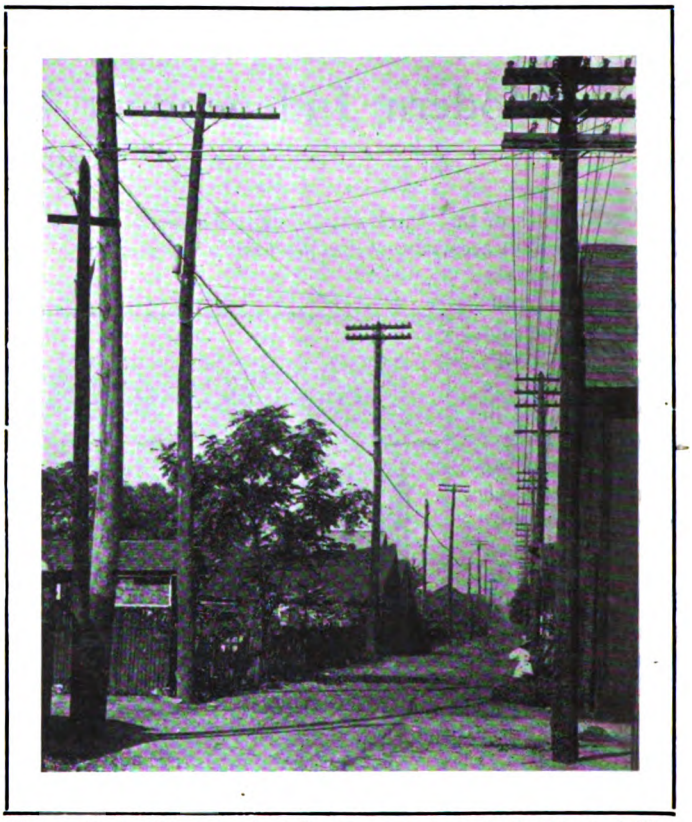


Distribution in Business District. Pole in Foreground Carries 25-Pair Cut-out.

For substation connections specifications call for one side of the drop to be No. 14 insulated copper, and one side bare wire. Open wire is used up to the outside of the building with an attachment within a foot of where the telephone is installed, if possible. The interior wire enters the building through two porcelain tubes. Each wire is run in by itself, with a drip loop on the outside of the building. For interior wiring No. 19 duplex wire is used. As little interior wire is used as possible, and it is concealed. No substation protectors are installed, reliance being placed upon the arresters at the central office, or on the lines themselves in the rural districts. The type of instrument used on all party lines is the Dean 4-party line Harmonic set. All telephones are installed under very minute and rigid specifications, and each line is inspected by the superintendent of the plant, and the report made to the general manager.

Main Office Building at New Philadelphia, Ohio.

Extremely good results from a service standpoint have been obtained since the reconstruction of the system. All of the new switchboards have 140 lines per position. New Philadelphia shows the average number of calls per hour for each position to be 168. Monthly peg counts are made, and also a weekly test of the service from subscribers' telephones. This is done by the trouble man. There is also circulated among the subscribers each month a card for him to report the condition of his service. The results received from this are very satisfactory, enabling the management to locate any difficulties before the development of any serious amount of dissatisfaction. Operators receive a quarterly increase of salary of 50c. for each and every quarter they remain in the service, if their deportment is satisfactory. No operator having an unsatisfactory record is allowed this increase, and this plan has been found to be a most effective means of keeping up interest in their work.



These poles in alley are gained for ten arms, formerly in place and filled with open wire. A 100-pair cable, multipled, now serves the same purpose.

For handling toll and long distance business there is a separate toll board of 2 positions, with 20 lines to each position, equipped with a calculagraph. The general instructions for toll operators, routing, holding circuits, etc., are practically the same as used by the United States Long Distance Company. Toll lines connect with the lines of the United States Long Distance Telephone Company, which give good toll line service throughout Ohio and joining States. Each local switchboard is equipped with a magneto position for rural lines. It is the first position on the first section, and is one of the busiest boards in the exchange, and requires a skillful operator.

(*Continued on page* 388.)

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Checking Long Distance Toll Messages and Pro-rating Earnings

By Geo. T. Hewes.

THERE is probably no feature of the Independent telephone business which has received less consideration than the methods of toll accounting. There are certain natural reasons for this condition. Primarily, the Independent local exchange is completed and as other exchanges are established within the same contiguous trade territory, the question of intercommunication between one exchange and the others occupies the attention of all connected with each local exchange. It is agreed that at least 95 per cent of Independent toll line business is within a radius of 100 miles from each exchange. This condition will change, however, as rapidly as facilities are provided for long distance service and it is to be prepared for this that means should be provided whereby all messages may be properly recorded, checked and accounted for, so that each company which provides toll lines shall participate and secure its prorata share of the tariff for the number of miles for which it provides facilities for transmission. In many cases at the present time, when messages are sent beyond 150 miles, two or more different companies provide the toll lines. As the distance of transmission from each local exchange is extended the jurisdiction of the local exchange is jeopardized, and so much so that one hesitates to build lines beyond where he can exercise exclusive control over the money collected for tolls, preferring to accept what business comes for points within the 100-mile radius, but refusing to put up with the uncertainty and inconvenience attending the handling of long haul business, for the reason above stated, i. e., that 95 per cent are transmitted not more than 100 miles and that beyond

USE REVERSE SIDE OF THIS TICKET
FOR CALCULAGRAPH

INDEPENDENT TELEPHONE CLEARING HOUSE

Station Called Check No.	IN DUPLICATE	Calling Station Check No.
701		

Patent Pending — Hewes System, License 1906 A.

Ckt. No..... Trk. No..... Date.....190...
Station Calling.....
Party Calling..... Tel. No.....
Authorized by.....
Party Wanted..... Tel. No.....
Station Called Via

Time	A. M.	Day	Night
Finished	P. M.	Toll	
Time	A. M.	Overtime	
Commenced	P. M.	Messenger	
Minutes Used		Total	

Collected at.....
Coupon or Frank No..... Opr.....
If not "O. K." Why?.....
Remarks.....

Face of Duplicate Side of IN Ticket. Actual size of ticket, 3⅝×5¾ inches. The "original" portion of this ticket is exactly similar in form, except for substitution of words "Original" and "Rubber Stamp Name of Your Company Here," which are placed as shown in reproduction of "OUT" Ticket.

this distance copper lines must be installed to provide satisfactory talking circuits.

In dealing with toll messages, one is dealing with that which is impalpable, and therefore must create a tangible something which can be handled and compared. The Clearing House methods of banking institutions appeal to us as the most obvious solution of this problem. By means of checks drawn each day in a certain locality the Clearing House settles all balances between its members the next day, with an accuracy which accounts for every penny. Each individual check issued by merchants, manufacturers or professional men is presented by the respective banking concerns to the Clearing House, which balances up the ac-

RUBBER STAMP NAME OF YOUR COMPANY HERE

INDEPENDENT TELEPHONE CLEARING HOUSE

Station Called Check No.	OUT ORIGINAL	Calling Station Check No.
951		

Patent Pending — Hewes System, License 1906 A.

Ckt. No..... Trk. No..... Date.....190...
Station Calling.....
Party Calling..... Tel. No.....
Authorized by.....
Party Wanted..... Tel. No.....
Station Called Via

Time	A. M.	Day	Night
Finished	P. M.	Toll	
Time	A. M.	Overtime	
Commenced	P. M.	Messenger	
Minutes Used		Total	

Collected at.....
Coupon or Frank No..... Opr.....
If not "O. K." Why?.....
Remarks.....

"OUT" Ticket—Face of Original. Duplicate Worded and Arranged Similarly, Except for Designation and Calculagraph Directions Appearing as on "IN" Ticket in First Figure.

counts for and against each bank, and effects a settlement on the basis afforded by these balances.

The International Independent Telephone Association at its last convention adopted the standard form of toll checks, after receiving a report from the Committee on Standard Forms of Accounting, of which the following is an abstract:

"There is no question but that the subject of 'Telephone Toll Accounting' in all its details has received the least attention as regards a uniform system or method, of any of the various accounts necessarily kept by a telephone company. The individual amount of money represented in each transaction is so small that there is a tendency to ignore those transactions which appear to be irregular or in error. For this reason, the persons handling toll accounts, realizing that there is no uniform cross reference method in vogue to be used as a countercheck against them, do not exercise the necessary care to be accurate. Knowing, oftimes, that the amount of time, labor and postage required to check errors involves a larger expense than the particular transaction in question represents, these small matters are ignored. At both ends of the line frequently this idea prevails. The absence of a cross reference method or system gives opportunity for dishonesty, or gross neglect in the records made by the operators. Whenever the cash is over it is allowed to accumulate until such a time as the cash runs short, and naturally it is expected that one should offset the other, and the tendency is to forget that the 'over' money belongs to the company.

"The sending station operator devotes more attention to her 'OUT' than to her 'IN' messages, for she realizes her personal responsibility connected therewith. The receiving station operator is exceedingly careless in recording her 'IN' messages, and heretofore has not been brought to task, when comparisons or checkings are made between the records of two stations, and her 'IN' station has been found to record a less number of messages than the sending station shows to have been sent 'OUT.'

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"'Through' messages are often switched by exchanges that do not own toll lines. Frequently, there being two or more routes by which a message may be sent to its destination, it is necessary that a 'THRU' ticket be used, which by its presence in the Clearing House will secure for the company over whose lines the message was routed, its pro-rata of the 'haul'; also the switching fee for the company which did the switching (if any

USE REVERSE SIDE OF THIS TICKET
FOR CALCULAGRAPH.

Calling Station Check No.	THROUGH DUPLICATE	Station Called Check No.
	901	
Patent Pending	Hewes System	License 1906 A

Circuit No..... Circuit No..... Date.....190...

From..... Tel. No.....

At.....

To..... Tel. No.....

At.....

Time A. M. | Routed Via

....

Connected P. M. Routed Via

.....

If Not "O. K." Why?.....

Operator.....at.....

This slip must be returned to General Office whether used, mutilated or defaced.

SEE INSTRUCTIONS ON OTHER SIDE

INDEPENDENT TELEPHONE CLEARING HOUSE

Face of Duplicate "THROUGH" Ticket. "Original" Differs from This Form Only in Respects Noted for "IN" and "Out" Tickets.

is charged), however nominal it may be. Any system which contemplates a 'square deal' is commendable, and the system proposed is absolutely fair to all.

"'Failed' or 'lost' calls have been entirely ignored and a system which insures that the same amount of attention will be given to every call whether it is 'cash,' 'charge,' 'deadheaded,' 'failed' or 'lost,' is one which will assist in maintaining the proper discipline at both the sending and receiving stations. Each and every call being accounted for by serial number on the toll ticket, compels the operator to give to each call proper attention. Inasmuch as each 'failed or lost' call is a matter of record under this proposed system, the tendency is to reduce the number of such calls to a minimum. It is expected that the committee appointed for the purpose of defining 'Standard Operating Rules and Regulations' will cover this particular point, as there is probably no more important function performed by a toll line company in its routine business, that should be universally agreed upon, than the method of the recording and transmission of a toll line message. The rules governing the same should insure accuracy, and a concise and complete record of each call; a record of each

INSTRUCTIONS FOR IN TICKETS

Always exchange numbers before transacting any further business.

RULES, Governing the use and application of this system of toll accounting.

1. Calling station will give station called the number of his or her "OUT" check and ask operator for his or her number on "IN" check and note same on blank space on "OUT" check before transacting any further business.

2. Station called on learning the serial number on the "OUT" check of station calling will record same on blank space on his or her "IN" check before transacting any further business.

These numbered toll tickets are charged against you and each one must be returned to General Office, whether used, mutilated or defaced.

They are to be used in their consecutive order.

INDEPENDENT TELEPHONE CLEARING HOUSE.

This Information Is Printed Upon the Backs of "Original" Forms for "IN" Tickets.

of the individuals who do the talking at each end of the line; a record of the individual against whom the transaction is charged, and the name of the person who authorized the charge to be made (if against a firm or corporation); the time at which the conversation took place; and a separate charge for the overtime in excess of a three minute conversation; the amount of the messenger fee, if any, and an opportunity for remarks in which to explain if the message was not O. K. and why. If the toll charges are reversed, provision is made on the ticket to contain all the necessary information which will insure the prompt payment of the toll charges.

"The importance and desirability of enabling each company which participates in the transmission of a toll message to secure its prorata share of the toll earnings, is as important as it is that the transmission of the toll mesage should be paid for. Where several connecting companies endeavor to have their interchanged business checked and prorated at one

INSTRUCTIONS FOR OUT TICKETS

Always exchange numbers before transacting any further business.

RULES, Governing the use and application of this system of toll accounting.

1. Calling station will give station called the number of his or her "OUT" check and ask operator for his or her number on "IN" check and note same on blank space on "OUT" check before transacting any further business.

2. Station called on learning the serial number on the "OUT" check of station calling will record same on blank space on his or her "IN" check before transacting any further business.

These numbered toll tickets are charged against you and each one must be returned to General Office, whether used, mutilated or defaced.

They are to be used in their consecutive order.

INDEPENDENT TELEPHONE CLEARING HOUSE.

Instructions Printed on Backs of "Originals" of All OUT Tickets.

central point, viz.—a clearing house—it is indispensable that a standard form of ticket be used, not only as to size, shape and color, but the quality of paper, similarity of printed characters thereon, as well as permanency of the record. The necessity for a modern clearing house has long existed and the pioneers in the field have been compelled to labor at a disadvantage for the reason that no standard forms to be used in toll accounting have yet been adopted. In considering the form for the ticket (i. e.: the information which it shall contain) we must consider the requirements of the rural subscriber and also the metropolitan. One form must do for all, having in mind the printing together each month at the clearing house

This Space Reserved for Calculagraph.

TO OPERATORS

Record Every Call Before Completing the Connection. Failure to record any call through a fancied lack of time because of other calls waiting is as inexcusable as it would be for the clerk at a bargain counter to tell the proprietor she was so busy handing out the goods that she could not take time to make out sales slips nor take in the cash. As the reason for the existence of the store is to get cash for its goods, so the only reason for the toll line connection is to get the cash or a record for the service rendered. Therefore, no excuse whatever can be accepted either from the sending or receiving oprator for failure to record every call "IN" to or "OUT" from, or "THROUGH" her station, except as provided in rule No. 2.

Calls offered from stations of some other Company not using this system of toll tickets will be exempt from Rule No. 1. Operators will be expected to bring to the notice of the **Clearing House** all cases of this kind with as little delay as possible but **Must Give** the other operator the number of her ticket either "IN," "OUT" or "THROUGH" (being a receipt for the call).

If Either the Sending Operator or Receiving Operator Should Refuse to Exchange Ticket Numbers, the operator who is willing to make the exchange of numbers necessary to the recording of the call **Will Refuse to Complete Connection,** and as a matter of self protection, the operator who was willing to record the call will make known his or her attitude and the facts of each case to the General Office as promptly as possible.

If the call cannot go through, there need be no charges entered on the ticket, but the reason **Must be Shown** on blank space on ticket marked "If not O. K. Why?" Each operator must inform the other operator so that the same notation will be on each ticket, both at station calling and station called.

In case any call fails to go through for any reason whatever, each operator will make a large **"X"** across the face of both original and duplicate tickets.

Before Hiring a Messenger, the operator at whose station a messenger is required **Must Know** beyond a doubt that the full amount to be paid out as messenger fee has been fully understood, **Authorized and Protected** by the operator at whose station same must be collected.

All Reversed Calls Must be Marked on Blank Space Between the Serial Numbers, at the top of each ticket in this manner: **"Rev."**

General Instructions Printed on Backs of All Duplicate Tickets.

of all tickets for comparison. Each duplicate ticket should be a fac-simile of the original.

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"There are other advantages, one of which is the opportunity of having the tickets printed in large quantities, which insures the lowest possible cost, and if perchance a company's supply of tickets should become exhausted, a neighboring company could help out in an emergency. The ticket should be as standard as the postage stamp and its method of use as thoroughly understood.

"In the banking world each check representing a specified transaction is handled through the banking clearing house, which each day settles transactions aggregating millions of dollars with absolute accuracy even to the penny. It must be conceded that a telephone clearing house provided with similar facilities will likewise be enabled to accurately settle the interchanged business, pro rating each telephone message. Each company over whose lines the message may have traveled, whatever the number of miles, will be represented in the clearing house by each toll ticket to have upon it the number of the ticket from the other company with which it was placed in co-operation, thus making a complete record for its pro rata share of the message fee. Such briefly is the system that is recommended for consideration.

"A deposit of drafts and cash at a banking institution is checked by deposit slip. The receiving teller takes the drafts, checks and money with the deposit slip, and immediately gives a receipt to the depositor for the aggregate amount, by entering in his pass book the amount in question. In the event of any error appearing you thus have substantial evidence in your possession; likewise, it is important in sending your interchanged toll business (report and tickets) to the telephone clearing house that you retain for yourself a copy of the report, and a copy of the tickets which represent every transaction. This duplicate ticket is provided by the original writing at the inception of the telephone message, and is a fac-simile record of the transaction. These duplicate tickets are retained at the respective telephone exchanges and are filed in envelopes systematically arranged, as you would post the accounts of your toll subscriber, and are the means whereby you are enabled to make out your monthly statement. Each transaction may be immediately reproduced in all its details, in case of controversy with a subscriber or toll company. Each toll ticket being serially numbered and having the corresponding number of the other ticket, with which it was placed in co-operation at the time the message was transmitted, enables you to easily check against the clearing house if necessary.

"Confusion is obviated even if two or more messages are transmitted on the same day by the same parties. In the event of any discrepancies should it be found advisable to correspond with the respective telephone companies whose business is being cleared, it is only necessary to refer to the serial number printed on the ticket, that a comparison can be made and the discrepancy accounted for.

"The distinguishing feature of this system of toll records is the exchange of check numbers between operators at the time of the message. The record of each call should be made before completing the connection. Failure to record any call through fancied lack of time because of other calls, awaiting, is as inexcusable as it would be for a clerk at a bargain counter to tell the proprietor that she was so busy handing out the goods that she could not take the time to make out sales slips or take in the cash. As the reason for the existence of the store is to get the cash for its goods, so the main reason for the toll line connection is to get the cash or a perfect

THROUGH TICKET

Always exchange numbers before any other business is transacted.

RULES, Governing the use and application of this system of toll accounting.

1. Calling station will give THROUGH station the number of its "OUT" check, which shall be written on blank space marked "Calling Station Check No."

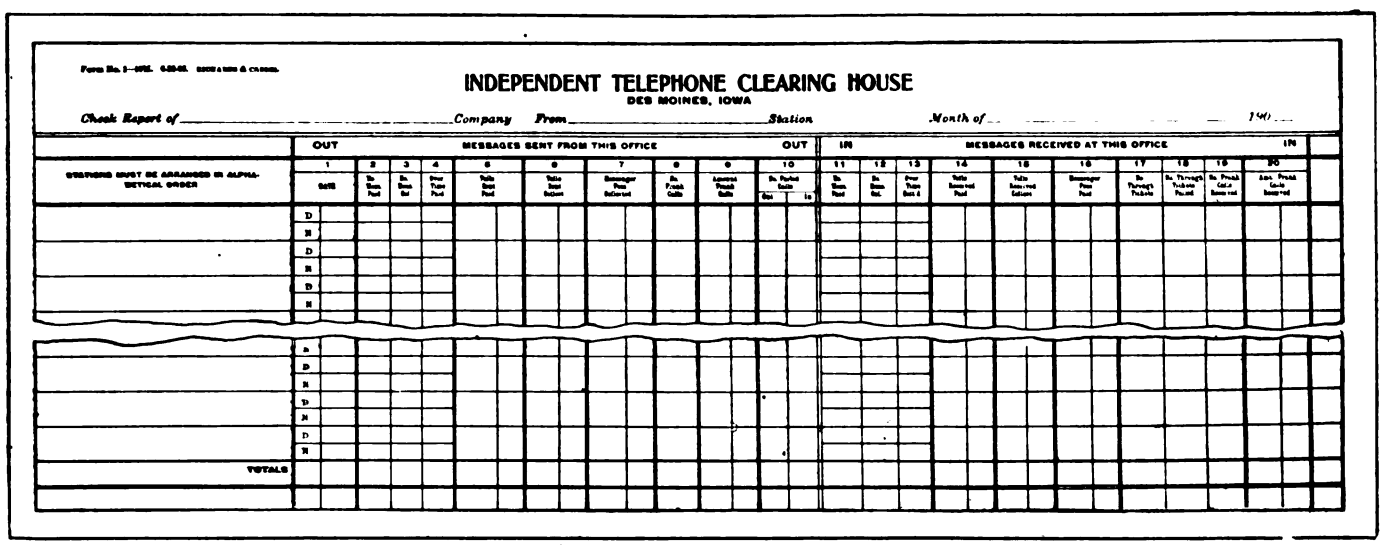
2. The Through station will immediately give the calling station the number of this THROUGH check, which shall be written on the blank space on the "OUT" check.

3. The Through station will then exchange a check number with the station called or the next through station, as the case may be.

4. These numbered toll tickets are charged against you and each one must be returned to the General Office, whether used, mutilated or defaced.

INDEPENDENT TELEPHONE CLEARING HOUSE.

Special Directions on Backs of "Original" of "Through" Ticket.



INDEPENDENT TELEPHONE CLEARING HOUSE
DES MOINES, IOWA

Check Report of _____ Company From _____ Station Month of _____ 190__

OUT — MESSAGES SENT FROM THIS OFFICE — OUT | IN — MESSAGES RECEIVED AT THIS OFFICE — IN

1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20

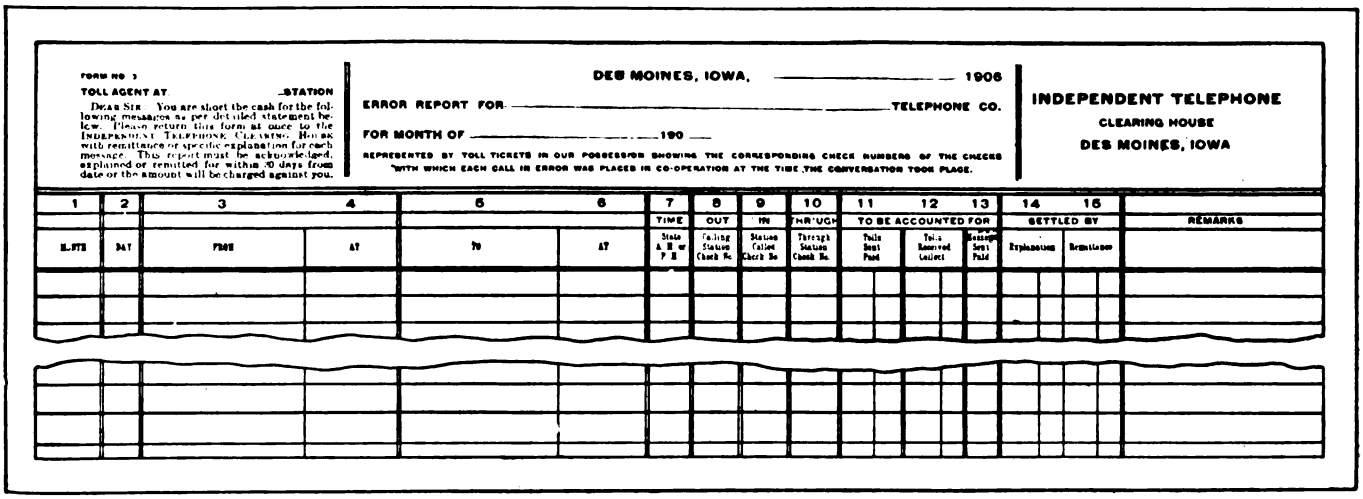
STATIONS MUST BE ARRANGED IN ALPHABETICAL ORDER | DATE | No. Short Paid | No. Short Rec. | Over Time Paid | Tolls Sent Paid | Tolls Sent Collect | Messenger Fees Collected | No. Prepaid Calls | Amount Prepaid Calls | No. Pocket Calls Dol. | No. Pocket Calls Cts. | No. Short Paid | No. Short Rec. | Over Time Rec'd | Tolls Received Paid | Tolls Received Collect | Messenger Fees Paid | No. Through Tickets | No. Through Tickets Paid | No. Prepaid Calls Received | Amt. Prepaid Calls Received

D / N / D / N / D / N

a / D / N / D / N / D / N

TOTALS

Form for Daily Check Ledger Used by the Iowa Clearing House.



FORM NO 3
TOLL AGENT AT _____ STATION

Dear Sir — You are short the cash for the following messages as per detailed statement below. Please return this form at once to the INDEPENDENT TELEPHONE CLEARING HOUSE with remittance or specific explanation for each message. This report must be acknowledged, explained or remitted for within 30 days from date or the amount will be charged against you.

DES MOINES, IOWA, _____ 1906

ERROR REPORT FOR _____ TELEPHONE CO.

FOR MONTH OF _____ 190__

REPRESENTED BY TOLL TICKETS IN OUR POSSESSION SHOWING THE CORRESPONDING CHECK NUMBERS OF THE CHECKS WITH WHICH EACH CALL IN ERROR WAS PLACED IN CO-OPERATION AT THE TIME THE CONVERSATION TOOK PLACE.

INDEPENDENT TELEPHONE
CLEARING HOUSE
DES MOINES, IOWA

1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15

TIME | OUT | IN | THR'UGH | TO BE ACCOUNTED FOR | SETTLED BY | REMARKS

No. STA | DAY | FROM | AT | TO | AT | State A. M. or P. M. | Calling Station Check No. | Station Called Check No. | Through Station Check No. | Tolls Sent Paid | Tolls Received Collect | Messages Sent Paid | Explanations | Remittances

Form for Recording Details of Errors Discovered at Clearing House in Checking Tickets One Against Another.

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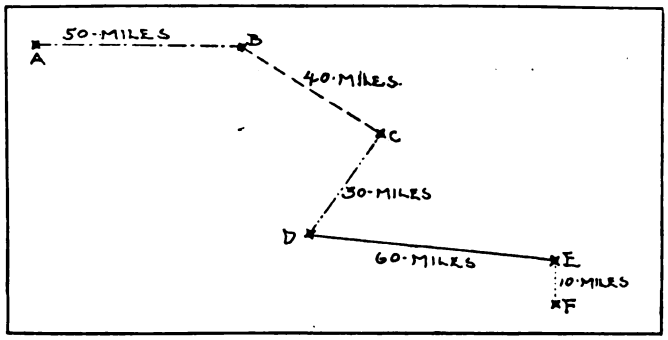
record of the service rendered. Therefore, no excuse whatever can be accepted, either from the sending or receiving operator for failure to record every call 'IN' or 'OUT' or 'THROUGH' her station, except as may be provided by a specific rule.

"Calls offered from stations of another company not using this system of toll tickets will be exempt from rule relating to numbered toll slips. Operators or managers are expected to bring to the notice of the clearing house all instances of this kind with as little delay as possible; your operator must give such connecting company's operator the number of her ticket either 'IN' 'OUT' or 'THROUGH,' it being a receipt for the call.

"A system of this sort will be of great assistance on very long hauls, where the calls are arranged by 'Morse' order wire through the use of the duplex circuits, it being merely necessary, after the serial numbers have been exchanged between operators at different points, for one station to notify another that the call represented by a certain number is ready.

"This system has been in successful operation since May, 1903, and was born out of the experience along similar lines in the sending, checking and pro-rating of telegraph business."



Example Map, Showing Course Taken by Message Over Lines of Different Companies.

All "OUT," "IN" and "THRU" checks representing interchanged business, that is, talks over two or more companies' lines, are sent accompanied by a summary report to the Clearing House. (See samples, Form No. 2.) These reports are made up from a daily check ledger. (See sample, Form No. 1.)

The tickets are assorted into separate lots, "OUT" calls, tolls sent paid, tolls sent collect (reversed), failed calls and deadhead calls. "IN" calls are assorted in a similar manner. Station represented by "A" reports 20 "OUT" tickets to station "B," which reports 40 "IN" tickets. "THRU" station "C" reports 40 "THRU" tickets to "B." By matching up the "OUT" tickets with the "IN" tickets (by reference to the serial numbers, which were exchanged by operators), we have 10 "IN" tickets for which there are no corresponding "OUT" tickets. The details of each error are copied on Form No. 3. (See sample, Form No. 3.) We are now prepared to pro-rate the earnings which are found to be correctly reported by both sending and receiving station. Mileage is measured between junction points "air line."

A map of Clearing House lines is provided showing only Clearing House stations and lines. In the accompanying illustration, there is shown an example map, on which each company's lines are represented by a different character. The toll rate from A to F is $1.90, passing over from companies' lines from A to B 50 miles, to C 40 miles, to D 30 miles, to E 60 miles, to F 10 miles. Total distance 190 miles, the message mile rate is therefore one cent.

A is entitled to 5/19 of $1.90, equals	$ .50
B is entitled to 4/19 of $1.90, equals	.40
C is entitled to 3/19 of $1.90, equals	.30
D is entitled to 6/19 of $1.90, equals	.60
E is entitled to 1/19 of $1.90, equals	.10
	$1.90

The Clearing House may provide for a commission to be paid on originating business, or both on originating and terminating messages. In this case, the commission should be deducted from the gross tolls, $1.90, and placed to the credit of the originating company before prorating. This would reduce the amount of message mile rate and consequently the amount due each company accordingly, each company participating equally in the commission; if it is desirable to make a charge for terminating fee in lieu of commission, this fee is deducted before pro-rating. Assuming that a call should originate at C and travel in either direction, only those companies over whose lines this message passes will participate in the division of tolls. Ofttimes there may be two routes by which a message may be sent from a given point, the routing is provided for upon the ticket, a blank space following the abbreviation "via."

After the error reports are returned to the Clearing House all those errors which are acknowledged and remitted for are prorated the same as new business.

A great many local exchanges own no toll lines whatever. They originate large amounts of toll business; they "get all they can and can all they get." They refuse to send messages to distant points collect (reversed), for they would realize nothing for their trouble, but the Clearing House is the solution of this problem.

FORM NO. 2.

INSTRUCTIONS

First column, No. 1, must show how many messages were day and how many were night.
Second Column, No. 2, must show overtime in Dollars and Cents.
N. B.—Great care should be taken in placing amounts in their Proper Columns.
Read your General Instruction Sheet for balance of instructions.
This form must be retained by you for reference in correcting errors.

CHECK REPORT FOR MONTH OF _____ 190__

_____ TELEPHONE CO'S EXCHANGE AT _____

BUSINESS DURING MONTH WITH _____ STATION OR EXCHANGE

DAY RATE _____ NIGHT RATE _____ ROUTED VIA _____ OR OVER LINE NO. _____

INDEPENDENT TELEPHONE
CLEARING HOUSE
DES MOINES, IOWA

	OUT	MESSAGES SENT FROM THIS OFFICE							OUT	IN	MESSAGES RECEIVED AT THIS OFFICE							IN	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	ROUTING
Day of Mo.	No. of Mess. Day / Night	Over Time Paid	Tolls Sent Paid	Tolls Sent Collect	Messages Pers. Collected	No. Frank Calls	Amount Frank Calls	No. Failed Calls Out / To	No. of Messages Day / Night	Over Time Amount	Tolls Received Paid	Tolls Received Collect	Mess. Fees Paid	No. Through Tickets	No. Thru Tickets Failed	No. Frank Calls Received	Amt. Frank Calls Received	SWITCHING STATION AND LINE NO.
1																		
2																		
3																		
30																		
31																		
Totals																		

EXAMINED AND CHECKED BY _____ GENERAL OFFICE CLERK _____ 1906

ENTERED IN REGISTER SHEET NO. _____

Summary Report Forwarded by Individual Companies to the Clearing House, with All Tickets Representing Interchanged Business.

Clearing House coupons good over the lines of all Independent telephone companies are to the Independent telephone cause what interchangeable mileage is to the Western Passenger Association.

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The expense of maintenance is sustained by each company participating and is based upon the gross amount cleared each month, according to the expense for clearance, and each company is assessed therefore. Standard forms at reduced cost, owing to the printing of large quantities, are the result of an organization of this character.

Deadhead business is reduced. While no control over local toll business is exercised, each interchanged call is censored by the Clearing House, and only those transmitted by authority of Clearing House pass are accepted. The disposition is to ultimately eliminate deadhead business, thus congestion of business on already overburdened lines is relieved.

The State Independent Telephone Association is the organization which should inaugurate the Clearing House for obvious reasons.

Iowa has the pioneer Clearing House in the Independent field. Michigan and Nebraska and some other States have similar institutions organized as traffic associations. Several other States contemplate similar organizations, and as a result Independent toll line business is being placed upon a sound financial foundation.

A MODERN INDEPENDENT COUNTY TELEPHONE COMPANY.

(*Continued from page 383.*)

The power plants used throughout the county are of the Holtzer-Cabot type, and are of sufficient size for the ultimate capacity of the exchanges. In installing them it was recognized that a great many companies make a mistake in installing too small a power plant. The power plant should be installed for the ultimate capacity of the exchange to secure the highest ultimate economy, and this was carefully figured out in advance for these plants. The batteries are in duplicate, and the machines are of sufficient size to carry the full load of the exchange when the ultimate number of lines has been installed.

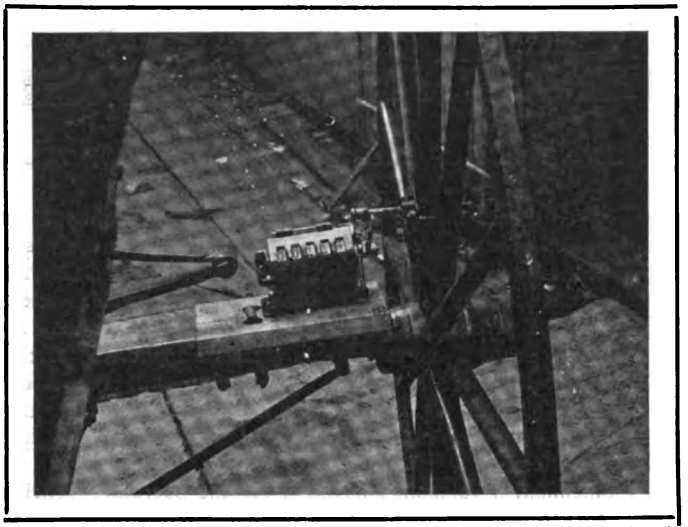
LOCATING TRANSPOSITIONS BY AN ECONOMICAL METHOD.

BY E. H. SIDWELL.

TRANSPOSITIONS can be located very quickly and economically by the use of a counting machine mounted upon a buggy axle, as shown in the accompanying illustration. In laying out transpositions on a line, after the plan has been worked out, all that is necessary is to measure off the proper distances and mark the transposition poles. To do this it is necessary to measure the circumference of the wheel, figuring out the number of revolutions to the quarter mile, if the transpositions are to be made on the A B C scheme, one at each quarter mile. Then, by setting the machine back to one at the end of every mile, the numbers will indicate the letters which should be put on the poles. For instance, when this plan was tried by the writer it was found that 116½ revolutions of the wheel covered 1320 ft., or one quarter of a mile. Marking the starting point A, the first quarter mile is reached when the machine registers 116½, corresponding to the letter B. A count of 233 would show that the buggy was opposite the half mile pole, where the transposition C should be cut in. At the end of three-quarters of a mile the machine would indicate the covering of the distance by registering 349½, giving the location of the B transposition; and at the end of the mile No. 466 shows the location of the pole which should have the A circuit transposed. The machine may then be set back again to cover the next mile, and transpositions cut in on the same scheme.

This correspondence of numbers and letters aids in keeping the records clear. As the transposition poles are reached they should be lettered and their numbers stenciled on them. The numbers are of course obtained by counting the poles, the one at the starting point being No. 1. If it is found that a transposition point does not come opposite a pole the circuit should be transposed on the nearest pole to the correct location, and a record kept, showing that the point indicated by the register was so many feet north or south of the pole upon which the transposition was actually located. From this record repair men may know exactly the correct location for the transposition and if it becomes necessary at any time in the future to reset the pole upon which it is made it will be put in the proper place.

Recently, when he laid out the transpositions on a line, the writer borrowed a counting machine from one of the daily papers and



Arrangement of Counting Machine on Buggy Axle Used by Mr. Sidwell for Locating Transpositions.

fastened it to a block, which was clamped to the buggy axle. Twenty-five miles of line were measured in one day, and all poles were counted and lettered as described. This makes a very inexpensive method of laying out transpositions, and enables the construction crew to transpose wires on an old pole lead as nearly right as the location of the poles will permit.

INDEPENDENT TELEPHONE SERVICE USED BY STOCK EXCHANGE AT COLUMBUS, OHIO.

THE Columbus Citizens Telephone Company has put in several stock extension telephones and inaugurated a new form of service in Columbus. There are nineteen members of the stock exchange. Three of these have had extensions run from their office branches to their desks in the exchange and two others have had telephones run direct into the central switchboard. It is expected to be but a short time before all the members of the stock exchange will have individual telephones at their desks on 'Change furnished by the Independent company.

DEATH OF ARTHUR VAUGHAN ABBOTT.

ON December 1st Arthur Vaughan Abbott died from pneumonia. He was born in Brooklyn in 1854, and graduated from the Polytechnic Institute of that city in 1875. After some years spent in the construction of electrical machinery and the building of electric railways, in 1892 he went to Chicago, as engineer of the Chicago Telephone Co. Before he resigned that position he had constructed twelve new office buildings with their equipments and lines. He had in the meantime done considerable electric lighting work. During the past few years Mr. Abbott had been on the engineering staff of Westinghouse, Church, Kerr & Co., in New York City, doing also a great deal of work in the field.

He was well known as a writer of articles for the technical press. For some time he was a regular contributor to THE AMERICAN TELEPHONE JOURNAL. He was the author of several well known books, among these being the "Electrical Transmission of Energy," which has gone through several editions, here and in foreign languages, and a series of six volumes on "Telephony." Mr. Abbott was a member of a number of engineering bodies, including the American Institute of Electrical Engineers, American Society of Mechanical Engineers and the American Society of Civil Engineers, and was a man who had to a marked degree the friendship and esteem of his professional associates.

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THE EDITOR'S PAGE

A NEW SOURCE OF ELECTRICAL ENERGY FOR TELEPHONE SYSTEMS.

TIPS on money making are valuable things not lightly to be passed around. A few days ago we alluded to the possibilities which lie dormant in the discovery of California scientists that anyone can change himself into a portable battery by the simple process of swallowing a pair of electrodes. As yet we have heard of no thoroughly practical application of this principle. Still, there is a wide opportunity, and even before results are obtained on this line some dreaming theorist may set to work on a new suggestion, which we offer absolutely free from conditions.

In Cincinnati a valuable innovation for the operators' retiring room in each exchange is a punching bag. Attention is called by the company to the fact that although these enable the girls to obtain beneficial exercise the expense of maintenance is considerable. Obviously the thing to do is to find some by-product of this exercise which can be turned to commercial account and made to pay for the maintenance. Here is the chance:

When an athlete has been vigorously striking a bag for one minute his body is found to be charged with static electricity. In fact his electrical potential is raised to such a degree above that of surrounding objects that if when in this condition he approach his knuckle to them a considerable spark will be observed. It is thus clearly evident that one effect of this form of exercise is to free a considerable amount of energy in the form of electricity at a comparatively high potential. Methods of continuously drawing off this energy from a person enjoying the exercise will at once suggest themselves to any person versed to the slightest extent in the electrical arts. The only unsolved problem is the application of this power in its available form to some useful purpose in a telephone exchange. Who will say that the field of telephone practice offers small opportunities to the inventor?

DISGRACEFUL COMPETITIVE METHODS.

PRINTED upon another page of this issue is the report of an attempt to impede the progress of a newly organized telephone company by methods which in the form of their conception and the manner of their execution are particularly disgraceful. We refer to the situation at Booneville, Indiana.

Men familiar with the influences which are set to work in that section of the country whenever any matter concerning the telephone service is being considered by a local governing body are at a loss to find more than one explanation for the insertion in the franchise of the clause compelling the new company to place its wires at an extraordinary height above the street. The action of the existing company, which immediately after the passage of the ordinance hastened to rebuild its system with the highest poles obtainable makes this explanation obvious. The relation is very close between the two acts; that of the city government, on the one hand, which took so unusual and unwarranted a method of limiting the franchise which it granted, and that of the telephone company, which took such prompt advantage of the situation thus created. In fact, so close is the relation that, even in the absence of definite proof, a reasonable man is likely to be strongly impressed with the belief that these two sets of proceedings fit together as a part of a single plan, conceived by one mind, hostile to the new telephone company and powerful enough to skilfully execute its purpose.

Now let us consider the results of these acts. In the first place the new company found itself confronted by a condition which would compel the investment of an extraordinary amount of money in aerial construction before it could be in a position to give service. This state of affairs alone would be sufficient to discourage business men who would otherwise have lent their financial support to the new undertaking. Aside from this, the very necessity for its existence seemed to have been done away with by the extension of the limits for free connections, and the diligence in improving its service which, for the first time in this locality, was shown by the company anxious to prevent the erection of a competing plant. The natural result was a cessation of activity on the part of those who had secured the strangely worded franchise.

Greed is, however, an urgent motive for action. The free country service was undoubtedly productive of heavy losses. A few days ago, after it had been in force for a few months, this service was withdrawn, and thus all possibility of convincing the public of the sincerity and uprightness of the motives of the company which had once granted it were destroyed. In this place, as in many others, people are now convinced that the great corporation which supplies them with facilities for communication is not above resorting to the employment of the devices of the pettiest trickster. The large telephone company has concentrated its influence and expenditures on this locality, with the sole result of most thoroughly discrediting itself in the eyes of its patrons and of such of its stockholders as are aware of this unpardonable waste of its resources.

Particularly open and reprehensible as are the violations of the principles of fair and upright dealing in this instance, coming from an unusual combination of improper methods of preventing honest and desirable competition, such methods as were employed are well known to have been practiced in many localities before this, and will undoubtedly come to light frequently in the future. To prevent their use is an urgent duty which devolves particularly upon the men connected with Independent telephone companies who know these schemes, and know the only certain remedy for them.

This remedy was emphatically called to the attention of all delegates to the Chicago convention by the discussion of the question of publicity. Fear of universal public condemnation is the only thing which will operate to prevent such acts as we have cited. Unjust discrimination in the matter of rates between one community and another cannot prevail in the face of widespread public knowledge of such rates. Facts concerning these matters form important and interesting items of news which newspapers are glad to print. It is for the Independent telephone men to gather these facts, and see that they are made public. Always such action must be prompt. Managers should be so closely associated that they can act on their own initiative. Taking these matters up through State and National headquarters produces valuable results, but it is too slow a method for local use. Let the facts be given by one manager to another over the telephone lines. One day ought to find such news in the hands of every Independent telephone manager in an entire State. The second day should be sufficient to put it before the eyes of every single newspaper reader in the State. Few things will be a greater help to the Independent telephone industry than the prevention of these unjust methods of hindering competition. To accomplish this in the best way get the facts; get them quickly; and give them to the papers for publication at once, while they are live news.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

DISTANCE BETWEEN ELECTRIC AND TELEPHONE WIRES IN INDIANA.

Kindly advise me how near an electric light company can place its wires to the telephone wires and comply with the law?

Suppose that a telephone company has been in the field for several years and an electric light comes in and while running makes a part of the lines so noisy that they can scarcely use them. Is there any law that will compel them to adjust the trouble, or pay damage? E. K.

THE statutes of the State of Indiana do not set any specific distance that must exist between the wires of an electric light company and telephone wires. If the telephone company is first in the field, and an electric light company afterwards builds in such a way as to interfere with the operation of the telephone exchange, or cause a disturbance upon the telephone wires, the telephone company can by injunction restrain the electric company from further interference, and make it pay damages for the interference which has already occurred. The court will then require that the electric wires be placed at such a distance from the telephone wires as to protect the latter from trouble. Northwestern Telep. Co. v. Iowa Tel. Co., 98 N. W. 113; Northwestern Telep. Exchange Co. v. Twin City Tel. Co., 95 N. W., 460; Chicago Telep. Co. v. Northwestern Telep. Co., 65 N. E. 329.

NEW RATE ORDINANCE AT LOUISVILLE, KENTUCKY.

A NEW telephone ordinance has been passed by the city of Louisville, Ky., and signed by the mayor. The chief feature of the ordinance is its regulation of rates of the Cumberland Telephone Company. The company has at least 5,000 subscribers in the city who will be affected by the reduction. The rates as fixed are as follows: office telephones, $4 a month; residences, within one mile of the courthouse, $2 a month; outside of this limit, but within two miles of the courthouse, $2.50 a month; beyond this, $3 a month; desk extensions, $1. The ordinance takes immediate effect. The penalties for failure to observe the ordinance are heavy fines, fixed for each overcharge at from $10 to $100.

The day after the signing of the ordinance, the United States Circuit Court issued a temporary restraining order enjoining the city from putting the ordinance into effect. The telephone company takes the position that the ordinance violates the fifth amendment of the United States Constitution which provides that "no person . . . shall be deprived of life, liberty or property without due process of law." The company claims that the ordinance will amount to confiscation, and also that the city is without power to regulate rates.

RAILROAD COMMISSION TEMPORARILY RESTRAINED FROM REDUCING TELEPHONE TOLLS.

THE Cumberland Telephone and Telegraph Company at New Orleans, La., has applied to the United States courts for a restraining order to forever enjoin the Railroad Commission from enforcing its recent order making certain reductions in the tolls for long distance telephoning in the State. The petitioners charge that the new rates fixed by the commission are unjust, unfair and unreasonable and should not be enforced.

In the petition filed in the United States Court it is stated that the Railroad Commission, at a hearing August 6, 1906, without proof or authorization for such action, greatly reduced the rates for long distance telephoning in the State; that the said commission issued order No. 522 covering this matter, and that it became effective September 1, 1906; that an appeal was made to the commission, but at a meeting held October 10 the appeal was set aside and the commission adjudged and decreed that its original order in the case should stand.

Petitioners allege that the enforcement of order No. 522 will mean simply the taking of the petitioner's property without due process of law, in direct violation of Section 1 of Article 14, constitutional amendments. They ask accordingly that an injunction issue restraining the commission from enforcing order No. 522, and that the present rates for telephoning which, it is alleged, are not excessive and are fair and reasonable be allowed to stand.

The court is also asked to adjudge and decree that the commission's order No. 522 is null and void.

The following extract is taken from order No. 522, showing the rates which the commission purposes to enforce if not interfered with: Not over twenty miles—One to ten miles, ten cents; ten to fifteen miles, fifteen cents; fifteen to twenty miles, twenty cents.

Over twenty miles—One to ten miles, ten cents; ten to fifteen miles, fifteen cents; fifteen to forty miles, twenty cents; forty to fifty miles, twenty-five cents; fifty to sixty miles, thirty cents; sixty to seventy miles, thirty-five cents; seventy to eighty miles, forty cents; eighty to one hundred miles, forty-five cents; over one hundred miles, one-half cent per mile. All of these charges provide for a three-minute conversation.

FORTY-ONE BELL TELEPHONES ORDERED REMOVED.

AT Kansas City, Mo., the city comptroller has ordered the Missouri & Kansas Telephone Company to remove forty-one of its telephones from the several city departments. The city is indebted to the telephone company in the sum of $6,000, which it refuses to pay on the theory that the company is indebted to it in a greater sum for alleged amount due for pole and overhead wire tax. The company considers the ordinance on which the tax is based illegal, inasmuch as it pays a large amount annually to the treasury for the use of streets for carrying the company's conduits and buried wires.

TERMINATION OF CONTRACT WHEN NO TIME IS MENTIONED.

This company has made a contract for connections and interchange of service with a long distance line that has a station here. There is no date mentioned in the contract when it shall be ended, and in fact nothing at all is said in the contract about the possibility of its ever being terminated. The long distance line now want to end the contract and say that they can do so at any time they wish, because of the omission to insert a length of time for it to run. What is the law on this question? We want to hold them as long as we can, as the contract is advantageous to us and not unfair to them. C. W. E.

YOUR connecting company cannot legally break the contract as contracts between different companies for their mutual benefit are not revocable at the will of one of the parties and a court of equity will decree specific performance of such contracts, in order to preserve the status quo of the parties. In order to secure the specific performance of such a contract it will be necessary for you to begin suit. You can ask for a temporary injunction restraining them from shutting you off from connections during the pendency of the suit. A case in which such a question arose is Western Union Teleg. Co. v. Pa. Co., 129 F. 849.

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IN THE OPERATING FIELD

ASSOCIATION OF INDEPENDENT MANAGERS FORMED IN MICHIGAN.

ON November 15th, a committee of gentlemen from different telephone exchanges met at Grand Rapids for the purpose of completing arrangements for the formation of an Association of Independent Managers of Michigan.

This project had its inception at the annual meeting of the State Association, at Ann Arbor last spring, and was so favorably thought of that at the annual convention of the Citizens' Telephone Company's managers held in Grand Rapids, May 11th last, to which four outside managers were invited, this committee was appointed, and it has since been working out the project.

The object of this association is to promote the application of the best methods along operating, maintenance, and technical lines to the telephone industry.

There has been a general meeting for all managers of the state, called for December 11, 1906, to be held at the building of the Citizens' Telephone Company at Jackson, at which time it is hoped to complete the organization of the association.

The following gentlemen constitute the committee, and have been actively engaged in this work: Chairman, Wm. Robinson, general manager Citizens' Telephone Company, Muskegon; secretary, H. T. Clough, district manager Union Telephone Company, Owosso; A. A. Burch, district manager Citizens' Telephone Company, Battle Creek; H. H. Hutchins, secretary Saugatuck & Ganges Telephone Company, Fennyville; C. G. Kehoe, manager Citizens' Telephone Company, Jackson; F. V. Newman, assistant to general manager Citizens' Telephone Company, Grand Rapids; F. M. Howard, assistant general manager Valley Telephone Company, Flint.

Every general manager who has been approached on the project has given it his unqualified support, and there is every reason to believe that the association starts with excellent prospects. It undoubtedly has a field wherein it can do much good.

INDEPENDENT TELEPHONES ADOPTED BY LARGE DEPARTMENT STORES AT COLUMBUS, OHIO.

THE David C. Beggs Company, of Columbus, Ohio, is composed of the Beggs Company and the Beall-Livingston Company, two of the largest department stores in the city, consolidated. A fine new building has been erected and the two stores have just amalgamated into one mammoth store with fifty separate departments, twenty-five being on the first floor.

The new firm has just closed a contract with the Columbus Citizens Telephone Company for a telephone for each of the departments on the first floor and ten more for the offices of the firm. The departments will have instructions to use the telephone freely with customers, the telephone company's part in the experiment being the advertisement of the firm in its directory by giving prominence to the departments in which the telephones are located.

The clerks are instructed at dull times and on rainy days to call up customers, and something like the following conversation will ensue:

"Oh, Mrs. Smith! You remember the other day we looked for some pink chiffon for you and had none that just suited. We have just placed on the shelves the loveliest assortment I ever saw, and I know you will be more than pleased." Or

"Mrs. Smith, we have just gotten in the finest line of wraps we ever had, and I have one laid by for you to see. It is a lovely garment and will suit you to a 'T.'" Or perhaps

"Is this the D. C. Beggs Company?"

"Yes. This is the place."

"Well, I want to speak to Nellie in the silk department. Is this Nellie? Yes? Well, say, Nellie, you know I was looking at that figured silk yesterday. I have concluded I'd better take 20 yards of it. Save it out for me, will you, before it is all gone?"

These telephones cost about 3 cents a day each and it is believed by the firm that a little telephone advertising on dull days will at least bring enough additional business to pay for the telephone service. The experiment will be watched closely by the telephone company and the mercantile firms of the city. The service will be inaugurated at once and if successful every department in the store will be fitted out with a telephone equipment.

There will be a branch exchange switchboard in the store so that connections can be made from the offices to all departments, as well as to the exchange of the telephone company.

BOOK REVIEW.

PRACTICAL LETTERING, by Thomas F. Meinhardt; 15 pages, 2 alphabet plates. Published by The Norman W. Henley Publishing Company, 132 Nassau street, New York, N. Y. Price 60 cents.

The development of the principles which need to be understood fully to obtain correctly proportioned results in lettering is the valuable feature of this book. There is clearly set forth a system intended to give a draughtsman guidance in training the eye so that, by force of habit, letters will be grouped with correct spacing between them. The means adopted to develop this scheme is the use of a scale of sixteen units in a manner which was invented by the author. The scale divides the letters into four quarters with a centre guide line, defines the optical proportions of a letter, and, as it is mechanical in construction, can be obtained for letters of any desired height by simply folding a strip of paper four times. The simplicity of this system is evident, and the valuable results obtained seem to be quite well demonstrated by the examples given in the book.

QUASI-PUBLIC CORPORATION ACCOUNTING AND MANAGEMENT. by John F. J. Mulhall, P.A.; 199 pages and numerous forms. Published by the Corporation Publishing Company, P. O. Box 2428, Boston, Mass. Price $5.00.

In this book the writer states briefly the books, forms and methods necessary for the proper organization and management of the business of corporations furnishing service to the public in the form of electric light, water and gas, and also electric railways, steam heating works and telephone companies. The headings of books necessary for recording essential figures for operation, maintenance and construction are given. Although the book is intended to be of interest to those engaged in an administrative or executive capacity in such companies, its principal usefulness would seem to be to give an accountant unfamiliar with the books of a corporation of this class an insight into the operations which he might be expected to perform.

The chapter devoted to telephone companies contains eleven pages, of which three are taken up by a skeletonized outline of a plan for the classification of revenue, operating and maintenance expenses, fixed charges and construction. The balance of this space is principally devoted to headings of typical books used in keeping these accounts.

PROCEEDINGS OF THE CHICAGO TELEPHONE CONVENTION PUBLISHED IN COMPLETE FORM BY INTERNATIONAL ASSOCIATION.

A DETAILED report of the proceedings of the convention of Independent telephone men, held at the Auditorium Hotel in Chicago on June 26th, 27th and 28th, 1906, has been printed and is being distributed by the International-Independent Telephone Association. The proceedings form a book

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of 248 pages, which is made up in a convenient size, and provided with an attractive cover of durable paper. It contains a complete record of the daily convention proceedings; all papers and reports of committees; a full account of the banquet, and also a complete list of officers of committees, with the names of all who attended the convention.

This book forms an exceedingly valuable and interesting contribution to the history of Independent development. The price of 25 cents which is obtained by the Association is so low as to insure a widespread distribution, and members have been advised to make early application for copies.

STRIKING BAGS FURNISH POPULAR EXERCISE TO TELEPHONE OPERATORS.

IN the exchanges of the Cincinnati and Suburban Bell Telephone Company at Cincinnati, Ohio, each of the operators' retiring rooms has a striking bag as a part of its furniture. One of these, as it appears in use, is shown in the accompanying illustration. It is stated by Mr. R. T. McComas, assistant general manager of the company, that this form of exercise is very popular with the operators, as many as ten having been observed at one time in the line waiting turns. From this point of view and the beneficial results of the exercise they are very satisfactory indeed.

It has been noted that the maintenance of this equipment amounts to a fairly large sum, as when subject to frequent use deterioration is rather rapid. On the whole, however, it would appear that the company at Cincinnati has found this experiment to be sufficiently successful to justify other companies in putting at the disposal of their operators similar means for recreation.

Telephone Operator at Striking Bag. A First Class Form of Exercise for the Retiring Room.

DOUBTFUL INFORMATION CONCERNING SUB-LICENSE COMPANY PUBLISHED IN TEXAS.

A RELIABLE correspondent in Texas calls attention to the following abstract from an item recently furnished to an Independent telephone journal which is published in Texas:

"The Texas and Pacific Telephone Company of Colorado City will at once inaugurate a new switchboard of 1,000 drops, made necessary by the phenomenal increase of patronage. The company began business here six years ago with a switchboard of 100 drops capacity. A new 450-drop board has been installed by the company at its exchange at Merkel, and a board of similar capacity will be placed at once in Sweetwater."

Our correspondent has to say in regard to this abstract:

"This outfit is a sub-licensee and connects at Abilene with the S. W. T. & T. Co. (Bell).

"The claim set forth above with reference to a 1,000 drop board for Colorado and a 450 drop board for Merkel, is so inconsistent on its face as to brand itself as a lie without comment. Merkel is as large as Colorado, and while they are both good live towns, neither would have any use for a 1,000 drop board. The writer of the above paragraph, not content with passing himself off as an Independent, and imposing upon an Independent journal for free advertising, goes still further and loads his tale until it sounds absolutely ridiculous to those who are near.

It is clear that the sub-license companies are extremely anxious to extend their influence and increase the investments of local stockholders in every possible way. The advisability of attempting to use Independent journals for publicity should appeal to these companies as doubtful, as when discovered exposure is almost sure to follow, and with it the presentation of facts which are likely to much more than off-set any advantages gained by a statement of false claims which cannot be substantiated.

VERMONT AND NEW HAMPSHIRE INDEPENDENTS TO MEET AT CONVENTION AND BANQUET.

ON January 8th, 1907, the members of Vermont and New Hampshire Independent Telephone Association will meet at the Hotel Low, in Bradford, Vt. After the business meeting, men from other States who will be present will tell of the methods which have come under their observation in different parts of the country. The information which they will give is expected to be very interesting and useful to all members of the local association. In the evening a banquet will be served to the members and friends of the association. All members will be expected to bring ladies with them, in order that this banquet may be as enjoyable as those which have been held after the transaction of business at previous meetings.

Amendments to by-laws will be taken up, and every Independent telephone company in Vermont and New Hampshire is urged to send representatives, as matters which are of much importance to all will be acted upon.

REMARKABLE DEVICE TO PREVENT COMPETITION PUT IN PRACTICE BY THE CUMBERLAND TELEPHONE COMPANY.

AFTER perpetrating a trick which temporarily prevented the efforts of the Luce Telephone Company to install a competing telephone system in the entire town of Booneville, Ind., the Cumberland Telephone Company has taken the final step to destroy its reputation for fair dealing with the citizens of that place. Some time ago the City Council granted to the Luce Telephone Company a franchise, but in this franchise there was inserted, for some reason which is locally reported to be well known to the Cumberland company and certain members of the Council, a clause providing that the Independent company must string its wires above those of the Cumberland company.

Immediately upon the passage of this ordinance the Cumberland company replaced its old poles with the highest sticks which could be secured, and at the same time introduced a free out-of-county service, which has for some time been the most important feature of its operation. This service has just been discontinued, and talk of reviving the Independent company is strong.

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QUERIES

TEST FOR OPEN CABLE WIRE.—(800.)

Will you kindly show some method whereby I can determine with some degree of accuracy the location of an "open" in one of the conductors of a pair in a lead covered cable. I have tried the "capacity test" with a voltmeter as described by one of your contemporaries but am unable to secure with the instrument in my possession, a sufficient difference in deflection on the discharge of a good wire and the bad wire to allow of comparison that will give me anything like accurate results. A. J.

First ground all of the wires in the cable, except the good wire of the pair which is open, to the sheath of the cable at the cable box; also ground the far end of the open wire to the cable sheath.

Then taking a Wheatstone Bridge and using in the same manner as when making a Murray Loop arrange connections as shown in Fig. 800.

The receiver "R" replaces the galvanometer. "A" is the variable resistance of the bridge; "B" the standard or fixed resistance. "P" is the primary side of an induction coil and "S" the secondary. This coil is used to boost the electro-motive force of the battery shown, in order to accentuate the noise, caused by the vibrations of the buzzer in the receiver; "a b" will represent

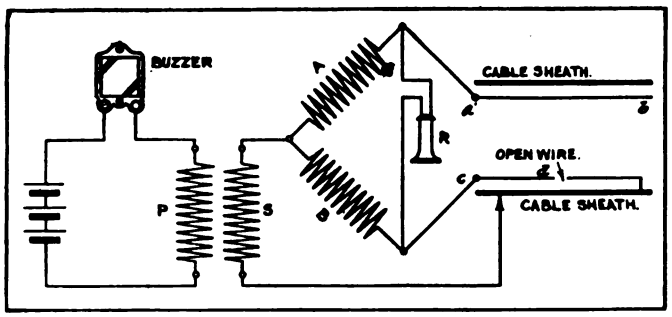

Fig. 800.

the good wire of the pair in trouble; "c d" wll represent the bad wire from the exchange to the open.

By moving the variable resistance "A" you will find that the noise in the receiver will increase or diminish according to the direction in which you move it. Theoretically there is one point at which you can find a perfect balance, one at which absolutely no noise will be heard in the receiver; however, in practice, the writer has never been able to exactly reach this much desired point as there always remained a slight noise. Therefore we will take a point at which the least noise is heard. This being as nearly as we can determine the point of equal balance we will then suppose (and for all practical purposes it does) that

$$A = c\ d$$
$$B = a\ b$$

then

$$A\ (c\ d) = B\ (a\ b)$$

and as

$$A : B :: a\ b : c\ d$$

and

$$a\ b = \text{Length of line}$$
$$\text{Sub. } A\ (c\ d) = BL$$

therefore

$$c\ d = \frac{B}{A} \times L = \text{Distance}$$

or the distance the open is from the office or c.

The reason you do not get as good results on the capacity tests with a voltmeter is owing to the comparatively short stretches of cable as usually run and the consequent low capacity. This is also further complicated by the poor insulation between the ends of the broken wire, and it is conceded that where this resistance is less than one megohm capacity tests are not dependable

The writer would suggest that unless the open wire in the cable is extremely valuable that the wire or the pair be abandoned rather than open the cable for the purpose of repairing them, because every time the sheathing is opened means a wiped joint and, as you probably know, joints are rather expensive.

WEEKLY OVERCHARGE FOR STORAGE BATTERIES.—(801.)

What is the object of giving storage batteries in a telephone exchange an overcharge once a week? J. F. K.

THE instructions commonly issued for the guidance of those having charge of storage batteries in telephone exchanges say that a battery which has to be charged every day should be overcharged once a week; a battery which has to be charged only every other day or less often is to be overcharged once every two weeks. This overcharge consists of a continuation of the regular charge until all portions of the electrodes are gassing freely and the specific gravity of the electrolyte shows no increase for a period of an hour and a half.

In the regular charge, even under the best conditions, certain portions of the surface of the electrodes are subjected to greater action than others. This may be due to a decreased clearance between the plates or to the condition of the surface of the electrode itself. If this action is allowed to continue these portions of the plates wear themselves out much more rapidly than the rest. It will be evident that this condition is one likely to become proportionately worse as the battery deteriorates as a whole, and is, therefore, a much greater menace to an old than to a new battery.

The regular overcharge insures that all portions of the electrodes shall be equally and fully charged; also, it thoroughly stirs up the electrolyte and equalizes the specific gravity in all parts. It furthermore tends to remove the causes which lead to unequal charging and discharging by putting all parts of the solution and the surface of the plates in uniform condition.

REVERSAL OF INDUCTION COIL CONNECTIONS IN BELL SUB-STATION SET.—(802.)

Why does reversing the secondary connection in a standard Bell substation set cut down the transmission? J. F. K.

DIRECT current from the central office battery flows through the primary of the induction coil and the transmitter of the sub-station set. Sound waves impinging on the transmitter diaphragm vary the pressure on the electrodes, and hence the resistance of the transmitter and the current flowing in the circuit. The variations of the direct current flowing in the primary produce alternating currents of the same frequency in the secondary of the subscribers' induction coil.

With the coil properly connected the alternating current flows out on the line in such a way as to add to the effect due to the variations in the direct current. If the secondary winding is reversed the alternating current tends to oppose the fluctuations and thus reduces transmission. To trace this action in detail is not difficult. It should simply be borne in mind that the variations in the primary current take place on the line itself, as this and the battery at the central office are in the primary circuit. In the secondary coil the induced current set up by an increase in the magnetism of the core always takes one direction, while that, due to a diminution of the strength of the magnetic field, always takes the reverse direction. When the direction of each of the windings of the coil is known, the proper connection may be easily determined.

As will readily be seen the effect is the same also on the receiving of incoming impulses. The two windings properly connected assist each other. If either one is reversed they oppose each other.

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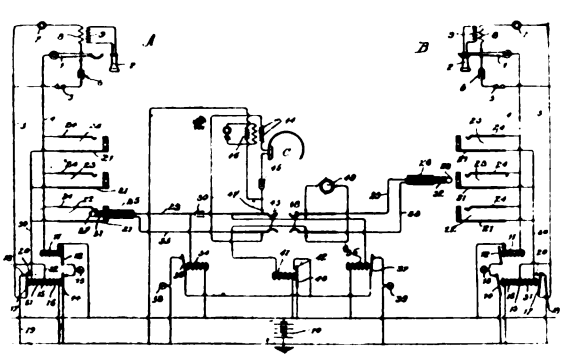
TELEPHONE PATENTS

TELEPHONE EXCHANGE SYSTEM.

Harry G. Webster, Chicago, Ill., patents (No. 835,047; dated November 6th, 1906; filed May 7th, 1903; serial No. 156,068) and assigns to Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., a telephone exchange system.

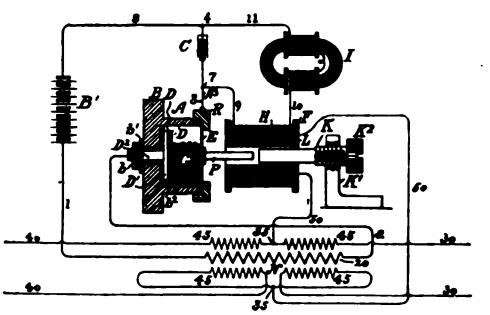
This invention covers circuits for a two wire multiple common battery switchboard. When a subscriber removes his receiver from the hook the circuit is completed from negative pole of battery 10, through line relay 11, the substation, thence back over the other side of the line to armature 17, contact 18 and conductor 19 to the positive battery pole. Line relay 11 is actuated, illuminating lamp 13. In addition to the circuit just traced there is also a circuit through winding 16 of the cut-off relay 15 to the positive pole of the battery, but this circuit is of comparatively high resistance, and sufficient current cannot be forced through it to cause the attraction of the cut-off relay armature 14 and 17.

When the operator inserts her answering plug in jack 22 there is set up a circuit from negative pole of battery 10 through supervisory controlling relay 41 to winding 51 of the cut-off relay, and thence through conductor 52 and armature 17 and back contact 18, from which it is carried to positive battery. The consequent energization of the cut-off relay causes attraction of its armatures 14 and 17. Although the attraction of armature 17 breaks the circuit through winding 51, the flow of current to positive pole of battery 10 through this winding is maintained for a short interval, through the circuit including winding 51 and winding 16. Armature 17 upon reaching its front contact 20 serves to close a low resistance circuit in shunt of winding 15, this circuit passing from jack contact 21 through conductor 50, contact 20, armature 17 and conductor 52. It will be seen that the attraction of the cut-off relay armature 14 puts out the line signal, and that at the same time the low resistance shunt about the cut-off relay winding 16 is broken, and a low resistance shunt is connected across cut-off relay winding 51, thus connecting the jack contact 21 directly with the line through a non-inductive circuit. The closure of the circuits through the supervisory controlling relay 41 causes the attraction of its armature 42, which closes the illuminating circuit for supervisory signal lamps 38 and 39. The relay 34, however, is also energized by the passage of current through circuit completed at the subscriber's hook switch, and signal 38 is not illuminated, while signal 39 stays lighted until circuit through relay 35 is closed by the answering of the called subscriber. When an operator obtains a busy test the circuit is as follows: From positive grounded pole of battery 10, through test winding 46, contact 47, upper spring of listening key 43, sleeve strand 29, sleeve contact 21, sleeve contact 32 of some other cord circuit, sleeve strand 33 of a corresponding cord circuit and the corresponding supervisory controlling relay 41 to the negative pole of common battery 10. The momentary closure of such a circuit through test winding 46 causes a click in the operator's receiver. If at the time of making the busy test the subscriber at a substation, such as B, has removed his telephone receiver from the hook, but his line signal has not as yet been answered, the test circuit may be traced from testing tip contact 28, through conductor 50, winding 51 of the cut-off relay to substation set, back to line limb 4, line relay 11 to the negative pole. This circuit also will produce a busy click in the receiver. The fact that test contacts 21 of the line jacks are provided with normal ground connection prevents the false operation of the busy test circuit, owing to inductive or static disturbances of the potential of the test contacts of the line jacks. When connection has been established between two subscribers they may converse with one another over a circuit containing only a single relay contact between armature 17 and contact 20. The short circuiting of voice currents is prevented by the impedance of the line signal in one limb and that of cut-off relay winding 16 in the other.



REGULATING DEVICE FOR TELEPHONE RELAYS AND TRANSMITTERS.

Herbert E. Shreeve, Newton, Mass., patents (No. 836,612; dated November 20th, 1906; filed October 26th, 1905; serial No 284,450) and assigns to the American Telephone and Telegraph Company a regulating device for telephone relays and transmitters.



The inventor describes a modification of a telephonic relay or repeater of the type covered in his previous patents Nos. 791,655 and 791,656, which is intended to prevent the packing of the granules in the carbon chamber. This consists in providing on the magnet which actuates the diaphragm of the carbon chamber an auxiliary winding *H* in series with an impedance coil *I*, the pair being shunted by condenser *C* and connected into the local circuit, as shown in the accompanying figure. It is to be noted that voice currents from the incoming line circulate in coil *L* of the magnet, causing the vibration of the pole piece, which varies the resistance through the local circuit of battery B^1, including primary winding 20, by means of which pulsating currents are reproduced in outgoing line 40. The strong pulsating voice currents in the local circuit are forced by the impedence coil to take a path through the condenser, thereby preventing a cycle of reaction adapted to cause the phenomenon of singing, which would occur if these currents were permitted to flow

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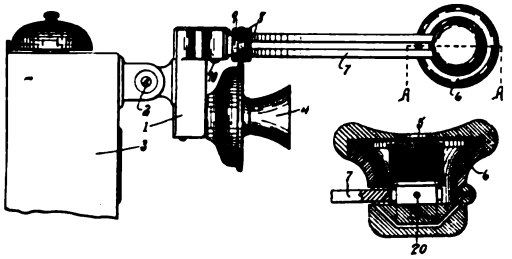
freely through the magnetizing coil *H*. This coil *H*, with impedence coil *I*, however, forms a closed path for steady currents; and if through any cause the granules in the carbon chamber become packed, and consequently their resistance to the passage of current diminished, the current in this local circuit increases the strength of the magnet, drawing electrode *E* away from the carbon chamber. This results in a sudden increase of the resistance of the button, and a diminution in the current flowing through winding *H*. It will be evident that there will ensue a vibration of diaphragm *E*, which will continue to agitate the carbon granules until equilibrium is established.

TELEPHONE RECEIVER.

Stephen C. Houghton, Syracuse, N. Y., patents (No. 837,469; dated December 4th, 1906; filed February 18th, 1905; serial No. 246,270) and assigns to the Wire & Telephone Company of America a telephone receiver.

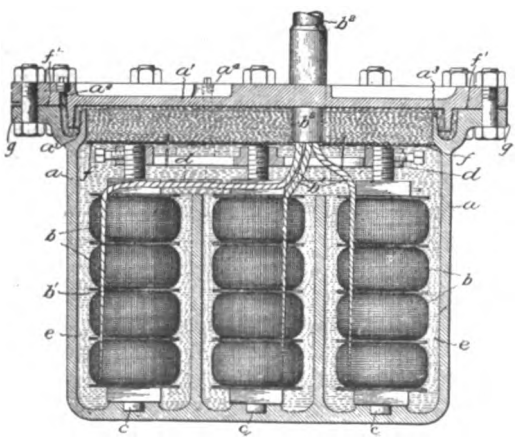


The most novel feature of this invention is the use of an extraordinarily long permanent magnet in connection with the receiver, and the utilization of this magnet as a support for permanently retaining the receiver in place. In one form of instrument embodying this invention, as shown in the accompanying illustration, the transmitter 4 is mounted upon a fixed support 1, which may be pivoted to a bell box at 2. The receiver has a pair of electro-magnets 5, each of which extends through an opening in a corresponding branch of the permanent magnet, formed by the bifurcation of the latter. Connection between the cores of the electro-magnets and the permanent magnets is formed by means of the pivot pins 20, which leave the receiver free to rock. At the heel the arms of the permanent magnet may be bent as at 8, and formed into a circle to embrace a stud, which supports the receiver arm, but leaves it free to rotate, so that it may occupy a position at either side of the transmitter.

CASE FOR LOADING COILS.

Henry F. Albright, New York, N. Y., patents (No. 834,352; dated October 30th, 1906; filed April 22d, 1905; serial No. 256,965) and assigns to the Western Electric Company, Chicago, Ill., a case for loading coils.

This patent has been granted on a case for the protection of the loading coils used in connection with long distance or trunk telephone cables. Toroidal shaped coils *b* are supported on axial spindles *c*, held in place at their upper ends by the spider *d*.



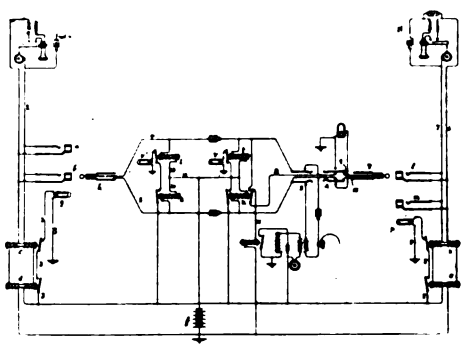
Conducting wires b^1 lead from the coils to the entering cable through the pipe b^2. The case, or pot, as it is commonly known, is provided with an annular flange *f*, to which the cover is secured above a corrugated metallic washer f^1. Iron flanges extend upward from the bottom of the case to form chambers, which isolate the groups of coils and prevent cross talk between the coils of different groups. To provide for sealing the case an upwardly projecting flange a^3 is provided near the rim of the case. This, together with the outer wall, forms a gutter, into which projects a rib of the cover.

Holes a^4 and a^5 are provided in the cover. In practice it is preferable to surround the coils and fill the case with rosin and rosin oil to the level of the spider. A partition *f* of card board may be then fastened to the spider, the cover secured in place, and hot asphaltum may be poured through opening a^5 until it oozes through opening a^4, showing that the case is completely filled and sealed.

CENTRAL ENERGY SYSTEM.

John G. Roberts, Evanston, Ill., patents (No. 835,868; dated November 13, 1906; filed April 2, 1903; serial No. 150,671) and assigns to the Western Electric Company, Chicago, Ill., a central energy system.

This patent covers an arrangement of line and supervisory signalling apparatus for a two wire multiple switchboard. When the subscriber at station A removes the receiver from the hook there is completed a circuit from battery *f* through relays *d c*. Relay *c* being differentially wound remains inert, while relay *d* is operated, and causes the illumination of the line lamp *g*. When the operator inserts the answering plug in jack *b* increased current flows through relay *k*, and the winding of the differential relay *c* included in limb 1, while a partial shunt is formed around the coil of relay *c* which is included in the cir-



cuit of limb 2 through relay *i*. The differential coils being thus unbalanced, the magnet is energized, and by the attraction of its armature breaks the circuit of line lamp *g*. The relays *i* and *k* are at this time excited, and both their armatures attracted, placing the clearing out signal v^1 in a position to be illuminated when the subscriber hangs up his receiver. When this occurs connection for the battery between limbs 1 2 of the telephone line will be broken at the switch, allowing relay *i* to release its armature and illuminating the disconnect signal v^1. Relay *k* remains in circuit until the removal of the plug.

At the other end of the circuit the functions of the relays are the same as those indicated except that the relay *u* has an extra contact, to which is connected a busy test relay in wire 11.

The inventor states that each of the windings of relay *c* may be 50 ohms, windings of relay *d* may be 100 ohms, and the windings of relay *i* and *k* may be 500 ohms each.

SECRECY DEVICE FOR PARTY LINES.

Koby Kohn, New York, N. Y., patents (No. 828,218; dated August 7, 1906; filed November 20, 1903; serial No. 181,944) and assigns one-half to Louis A. Ksensky, of Denver, Col., a secrecy device for party lines.

The inventor describes a secrecy device for party lines, the present patent being issued for improvements on the device described in inventor's previous application. In the first application he covered a secrecy device for a four-party line, in which five relays and numerous contacts were employed at each of the substations. The system covered by the present patent is an improvement, as only four relays are necessary.

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POSITION WANTED—Young man, age 27, who has exceptional ability as telephone man and manager will be open for re-engagement January 1st. Would like management of an Independent operating company. Have twelve years' experience. Address, Box 731, care THE AMERICAN TELEPHONE JOURNAL, 100 William St., New York. 731

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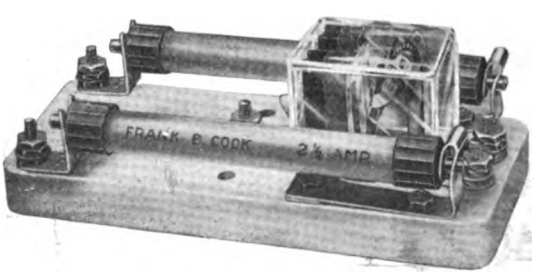

Your telephones are not immune just because lightning storms are over for the season. Snow and sleet storms cause many crosses with high voltage lines. Such crosses cause bad fires and accidents. COOK'S TYPES B4-B5-B6 PROTECT YOUR TELEPHONES. ASK MORE ABOUT THEM.

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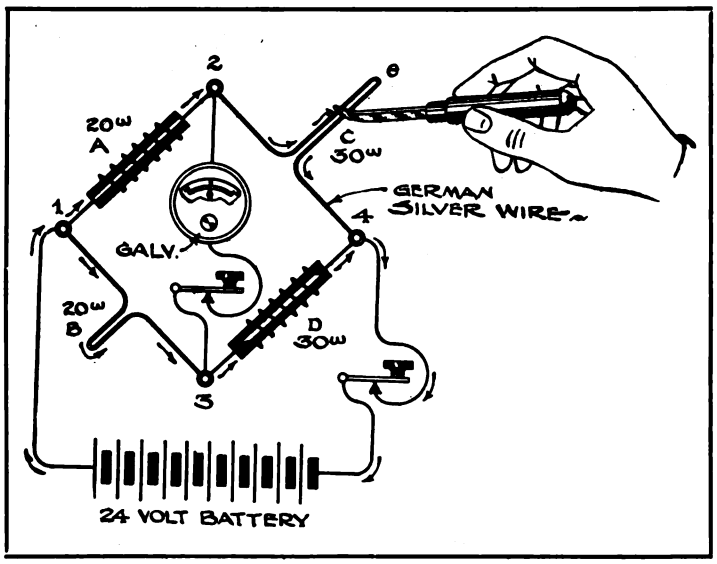
IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

BALANCING THE DEAN BRIDGE INDUCTION COIL.

COMMON battery instruments manufactured by the Dean Electric Company, of Elyria, Ohio, as is well known, have a novel talking circuit which employs the principle of a balanced Wheatstone bridge. This is so arranged as to keep the direct current flow from the receiver while the voice currents, which are alternating, are forced by the arrangement of the retardation and non-inductive low resistance coils, located in the different arms of the bridge, through the receiver.

In the accompanying circuit diagram are shown the connections for testing and adjusting the different windings, *A*, *B*, *C* and *D* of the induction coils, so that the required conditions of balance may be obtained. In manufacturing the coils the non-inductive winding *C* is left purposely of slightly greater resistance than is necessary for a perfect balance in order to provide a means for taking up any inequalities introduced through the process of manufacturing. The four coils are wound on the spool and tested separately in order that it may be ascertained whether there is any defect in any one of them. They are then soldered to the terminals 1, 2, 3 and 4.

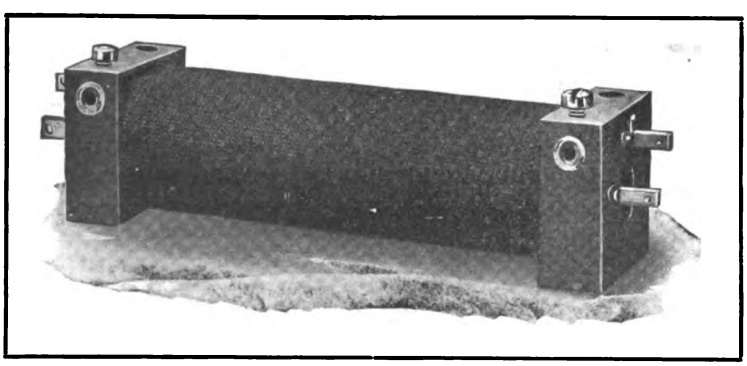


Special Circuit Arrangements for Obtaining Perfect Balance of Bridge Induction Coil.

It will be seen that this testing circuit is the ordinary Wheatstone bridge circuit and that the balance will be indicated by an absence of deflection of the needle of the sensitive galvanometer.

Although when the induction coil is placed in connection with this special circuit, a deflection will be observed, the adjacent wires of the loop in the non-inductive winding *C* are left accessibly placed for the special purpose of facilitating adjustment to the condition of perfect balance. The tester removes from their surface the insulation on the loop *E* and a short circuiting clip is passed along this loop until there is reached a point which causes the galvanometer needle to stand at the neutral line on the scale. This test indicates that the correct length of winding *C* for a perfect balance has been determined, and the short circuit of the loop *E* is made permanent by a soldered connection at the point indicated by the position of the clip.

Attention is called to this test, and to the extremely satisfactory features attained in service with the common battery instruments in which the balanced bridge induction coil is used, by the Dean Electric Company, in its Bulletin No. 102. It contains full information concerning the equipment for common battery subscribers' stations manufactured by the company, and will be sent without charge to all interested persons who ask for it.



Induction Coil, Having Balanced Bridge Windings, Manufactured by the Dean Electric Company.

UNDERWRITERS' RULES FOR TELEPHONE PROTECTORS.

THE American Electric Fuse Company, of Muskegon, Mich., and New York City, has just issued a very concise little booklet including all the rules of the National Board of Fire Underwriters for the installation of telephone protectors.

This is a book that all telephone companies should have. The American Electric Fuse Company will mail one free on request to anyone making application.

THE SWEDISH AMERICAN TELEPHONE COMPANY, Chicago, Ill., is sending out postal cards showing its new factory. The size and attractive appearance of this large manufacturing establishment are very clearly indicated.

THE TELEPHONE TOLL METER COMPANY, of Lyndonville, Vermont, has patented a toll meter which is a very interesting and novel addition to well known types of telephone supplies. Managers are familiar enough with the fact that complaints from subscribers who believe that they have been charged for too long a period on a toll conversation occur very frequently. Hitherto there has really been no satisfactory means of convincing a subscriber who is in error. On the other hand, to submit to his statement of the facts, and make a rebate, causes a lack of confidence in the timing of operators, and confirms in subscribers a bad habit which is likely to cost the telephone companies considerable money in the long run.

The toll meter which is being put upon the market by this company, of which I. H. Hall, Jr., is manager, is designed to prevent such annoyances as this by furnishing a means whereby the subscriber may keep a check upon his conversations, and thus avoid any possibility of making errors in judgment which will cause him to annoy the telephone companies by unjustifiable complaints.

THE COLUMBIA ELECTRIC COMPANY, Knightstown, Ind., has recently taken possession of its new building, where it has largely increased facilities for turning out telephones and switchboards. With the increased facilities which come from the enlargement of its factory, the company is prepared to handle work on a much larger scale than it could do before and to ship orders promptly. It will send information concerning its products to interested persons.

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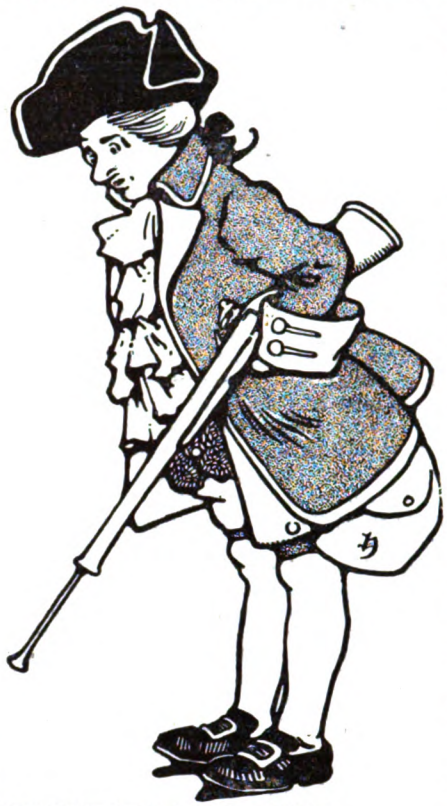
Your order for a box of tacks will receive just as prompt attention as your order for a car of x-arms or wire. Our immense stock insures prompt shipment.



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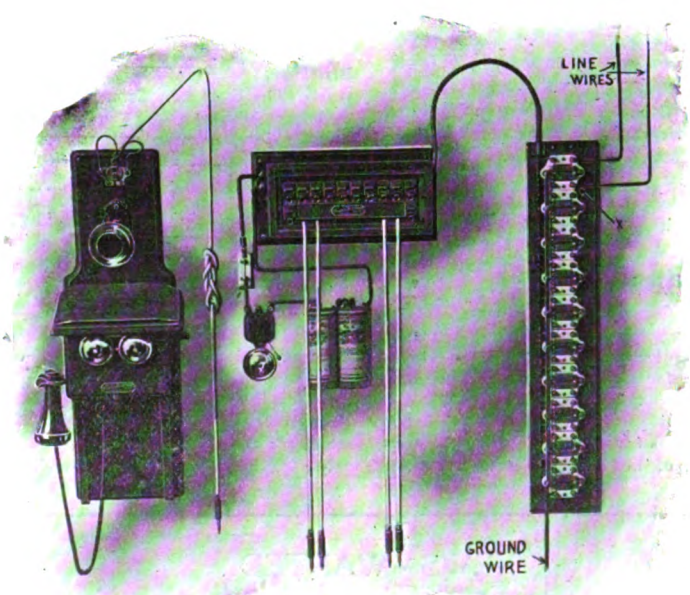

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No ringing keys
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No expert work required to set up
No trouble
No mistake if you write us for bulletin 40X

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THE WEEK'S MESSAGES

NEW COMPANIES.

LAKE WEIR, FLA.—An Independent Telephone Company is being organized at Lake Weir to connect that city with Ocala. Among those interested in the enterprise may be mentioned H. W. Henry.

LA HARPE, ILL.—The farmers and citizens of La Harpe are now prepared to effect a permanent organization to be known as the La Harpe Telephone Company, and will at once establish an exchange at this place.

MIDDLETOWN, ILL.—The Middletown Mutual Telephone Company has filed articles of incorporation. The incorporators are J. C. Lloyd, P. J. England, Thomas Dorgan and Louis A. Buckner. The capital stock is placed at $2,500, divided into 125 shares.

THAYER, KAS.—A new telephone company, to be known as the Little Friend Telephone Company, has been formed by the farmers living east of Little Friend, and it is its intention to build lines into Thayer.

SKILLMAN, KY.—A Farmers' Telephone Company is being organized at Skillman.

WORCESTER, MASS.—Articles of incorporation have been filed by the Worcester County Home Telephone Company, an Independent company, which is to enter into active competition with the Bell Company. The nominal capital is given as $5,000, but it is understood that about $2,500,000 will be expended in establishing a telephone system in Worcester county. The officers of the company are: President, W. H. Cook; vice-president, Richard Healy; treasurer, Charles F. Marble.

ST. PAUL, MINN.—Articles of incorporation have been filed by the Monson Automatic Telephone Company. The capital stock is $500,000, and the following are among the incorporators: Harry Dranger, G. P. Sandberg, J. M. Anderson, Lars Rosness, Adolph Johnson, H. E. Wolkow, all of St. Paul, and A. E. Monson and J. G. Allen, of Minneapolis. The company's principal place of business will be located at St. Paul, although it is at liberty to maintain offices and places of business in other cities throughout the state. The following officers have been elected: President and treasurer, J. M. Anderson; vice-president, G. P. Sandberg; secretary, Lars Rosness.

BIG TIMBER, MONT.—The Big Timber Home Telephone Company has been incorporated with a capital stock of $10,000. The incorporators are J. S. Haley, of Livingston, and J. F. Asbury, H. O. Kellogg, J. G. McKay and W. A. Moore, of Big Timber.

WILLOW POINT, N. Y.—The Willow Point Telephone Company has been incorporated with a capital stock of $500.

MANDAN, N. D.—The Mandan Telephone Company is to be reorganized and an entire new system installed. It is estimated that the proposed plant will cost about $8,000, and will consist of the latest and most improved apparatus.

HAVANA, O.—A new Independent Telephone Company has been organized at Havana, and work on the system will be commenced at once. The company hopes to have its lines in operation by February 1st.

MARFA, TEXAS.—The Marfa Power Company has been incorporated for the purpose of constructing a telephone system. The capital stock is placed at $3,500, and the incorporators are W. F. Mitchell, L. C. Brite, C. S. Murphy and others.

NAVASOTA, TEXAS.—The Washington Navasota Telephone Company, of Navasota, has been incorporated with a capital stock of $750. The incorporators are H. C. Lehde, Gus Stulz, J. W. Brosig and others.

FRANCHISES.

CARLINVILLE, ILL.—The Carlinville City Council has granted to the Carlinville Telephone Company a twenty-five year franchise.

CLINTON, MASS.—The recently organized Worcester County Home Telephone Company has made application for a franchise at Clinton, and has also filed similar applications at Gardner and Leominster.

RENO, NEV.—In response to an invitation from the citizens of Reno, who are much dissatisfied with the service of the Bell Company at that place, the Automatic Telephone Company, of Los Angeles, is to make application for a franchise to operate in Reno in opposition to the Bell Company.

CAMBRIDGE, N. Y.—The Commercial Union Telephone Company expects to make application for a telephone franchise at Cambridge.

SEATTLE, WASH.—Permission has been granted to the Independent Telephone Company to build additional lines in Seattle.

WYOMISSING, PA.—The City Council of Wyomissing has granted a franchise to the Consolidated Telephone Companies.

STRATHCONA, ALB., CAN.—The Council of Strathcona has received an application from the Edmonton City Council for a twenty-year franchise for the extension of the Edmonton telephone system in that city. Address Mayor May, Edmonton, or Mayor Sheppard, Strathcona.

FINANCIAL.

SANDWICH, ILL.—The stockholders of the Northern Illinois Telephone Company have declared a semi-annual dividend of 3½ per cent., payable January 1st.

ISHPEMING, MICH.—The Marquette County Telephone Company has increased its capital stock from $60,000 to $100,000.

NEW YORK, N. Y.—The American Independent Telephone Company, of New York City, has increased its capital stock from $100,000 to $500,000.

SPOKANE, WASH.—The Interstate Telephone Company has filed notice of an increase in its capital stock from $100,000 to $500,000. The trustees of the company are J. W. Fisher, A. Galland, A. F. Harris, F. W. Haaverland and M. A. Phelps.

ELK MOUND, WIS.—The Elk Mound Telephone Company has declared a dividend of 10 per cent. this year, an increase of 4 per cent. over that of last year.

COMBINATIONS.

ABILENE, KAS.—The Buckeye district of the Farmers' Mutual Telephone System is to sever its connections with the Bell Company, and form connections with the Brown lines in that section.

WINCHESTER, KY.—The Old Kentucky Telephone and Telegraph Company has become merged with the Central Telephone Company, of Louisville. Under the new management many improvements will be made, among them the erection of a new exchange building, and the installation of a central energy system to replace the present one.

HAMILTON, MO.—The purchase of G. A. Barnes's interest in the Hamilton Home Telephone Company is being considered by C. C. Munsell, of Excelsior Springs, Mo., and T. C. Kern, of Hiawatha, Kas.

NEWBURGH, N. Y.—The Home Telephone Company, of Albany, which has already become the owner of the Independent systems at Kingston, Poughkeepsie, Saratoga and Troy, has purchased the plant of the Colonial Telephone Company at Newburgh. It is the intention of the new owners to greatly improve the plant.

ALLENTOWN, PA.—General Superintendent West, of the Consolidated Telephone Companies, has completed arrangements for the leasing of the Slate Belt Telephone Company, of Northampton County, for a term of 999 years. The Slate Belt Company has about five hundred miles of lines, with exchanges at Nazareth, Bath, Bangor, Pen Argyl and Portland. A new line, 16 miles long, is to be built from Portland to Stroudsburg, and many other improvements and extensions are contemplated.

ELECTIONS.

BROWNSVILLE, IND.—At a recent meeting of the Brownsville Telephone Company the following officers and directors were elected: President, Geo. Job; vice-president, J. L. Maher; secretary and treasurer, O. C. Brown. Directors: J. L. Maher, C. A. Brown, Geo. Ridge, Lee Keller, A. J. Bond, Albert Wadsworth and W. H. Hawkins.

FORT WAYNE, IND.—The Home Telephone Company, at its annual meeting, re-elected the old board of directors, as follows: Charles S. Bash, J. B. Reuss, W. L. Moellering, M. B. Fisher, Isadore Lehmann, William Bohn, G. Max Hoffman, Geo. T. Fox and P. W. Smith. The board re-elected Mr. Bash, president; Mr. Reuss, vice-president; Mr. Moellering, secretary; and Mr. Fisher, treasurer.

NORTHFIELD, MINN.—The Northfield Telephone Company, recently

NEWS—WANTED

THE matter contained upon the message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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Form G-90-B.	For City Exchanges having many Rural Lines.
Form G-90-C.	For City Exchanges, Rentals and Toll Charges separated.
Form G-90-E.	For Small Exchanges, Rentals only.
Form G-90-F.	For Small Exchanges, Tolls only.
Form G-90-G.	One subscriber to a sheet; carries account 4 years.
Form G-90-H.	One subscriber to a sheet; carries account 12 years.
Form G-90-I.	For Small Exchanges; Bound Books; carry 12 subscribers on a page for 1 year.

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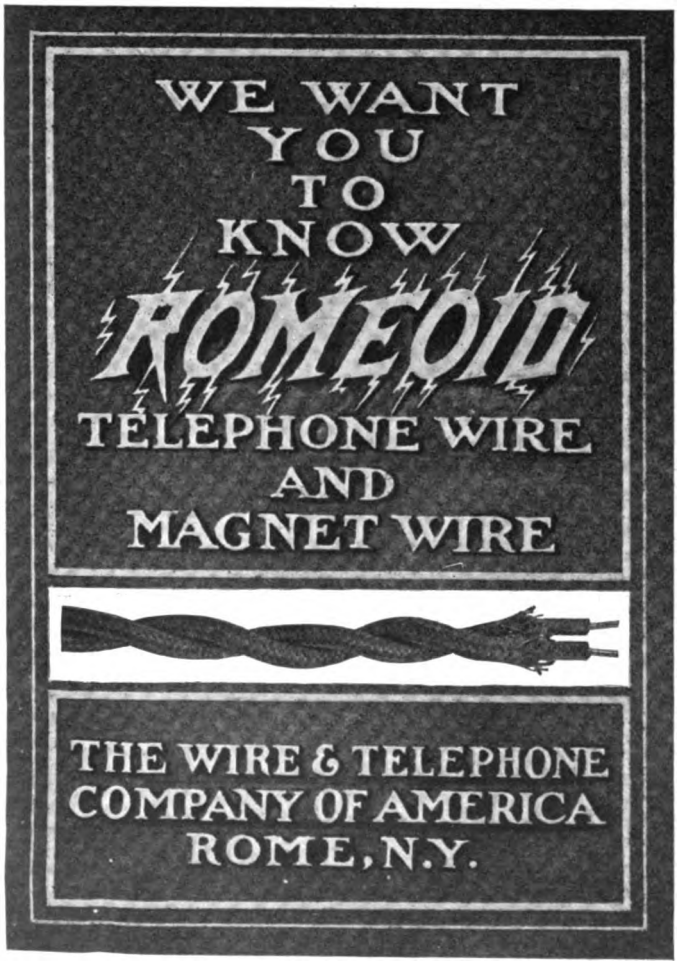

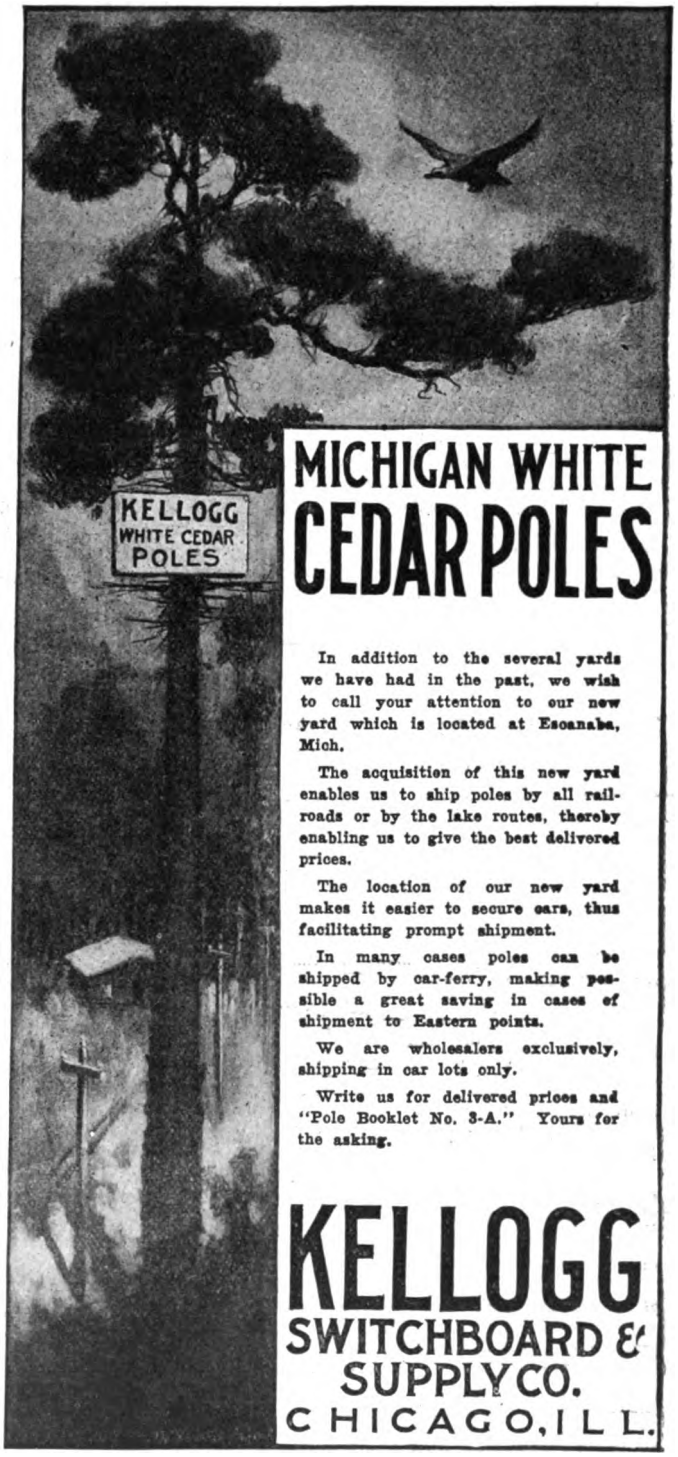
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In addition to the several yards we have had in the past, we wish to call your attention to our new yard which is located at Escanaba, Mich.
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THE WEEK'S MESSAGES

incorporated, has elected the following officers and directors: President, William Ebel; vice-president, Charles Crandall; secretary, D. D. Turner; treasurer, F. J. Wilcox. Directors: W. A. Hunt, G. A. Miller, Erick Halvorsen, A. L. Dixson, Frank Harkness, Nels Parsons, D. D. Turner, Charles Crandall, William Ebel.

OXFORD, N. Y.—The following officers and directors have been elcted by the Oxford & Gifford Telephone Company: President, Ward B. Gifford; secretary and treasurer, Jesse Jacobs. Directors: T. T. Cone, D. S. Marshman, F. J. Race.

TRUMANSBURG, N. Y.—The recently organized Trumansburg Citizens Telephone Company has elected the following officers: President, R. J. Hunt; vice-president, W. A. Garvey; secretary, S. E. Ormsbee; treasurer, L. J. Wheeler. The company will build lines in Trumansburg, Mecklenburg, Reynoldsville, Jacksonville, Searsburg and Covert.

HAZELGREEN, W. VA.—The Ritchie County Telephone Company, which has recently changed its name to the Progressive Telephone Company, and incorporated, has elected the following directors: M. L. Law, H. H. Goff, P. J. Fling, J. C. Bush, L. S. Vannoy, J. W. Goff and T. L. Hartman.

MISCELLANEOUS.

SPRINGFIELD, ILL.—An agreement has recently been entered into between the Kinloch Telephone Company and the Interstate Independent Telephone Company to exchange service. This arrangement will give the Independent Company long distance service between Chicago and St. Louis and all towns reached by the Kinloch system.

QUIMBY, IA.—The Farmers' Telephone Company, of Quimby, has made arrangements for the connection of its system with that of the Holstein Telephone Company, at Holstein.

AMITY, PA.—At a meeting of the stockholders of the Amity Telephone Association it was unanimously decided to enter into an agreement for the exchange of service with the Greene County Telephone Company.

LA CROSSE, WIS.—H. M. Rounce, superintendent of the La Crosse Telephone Company, of La Crosse, Wis., reports that the company's gain during the present year has been approximately 20 per cent. This is due to the excellence of the company's service, given in the face of the sharpest competition.

MUKWONAGO, WIS.—The Eagle Telephone Company, which includes Mukwonago, is to connect with the Prospect, Guthrie & Big Bend Telephone Company.

PERSONAL.

THOMAS F. DELURY has been appointed manager of the Oakland, Cal., exchange of the Sunset Telephone and Telegraph Company.

J. B. EARLE, of Waco, Texas, general manager of the Brazos Valley Telephone Company and the Texas Telephone Company, was elected at the last meeting of the directors general manager of the South Texas Telephone Company. This places about two thousand miles of line and a dozen or more exchanges under Mr. Earle's charge.

THOMAS EWART, formerly of Marlboro, Mass., has been appointed manager of the New England Telephone and Telegraph Company's exchange at Leominster, Mass.

FRANK McNALLY has recently resigned his position at Washington, Iowa, to accept that of manager of the Carroll County Telephone Company, Carroll, Ia.

H. E. TERRY has taken charge of the exchange of the Central Union Telephone Company at Moline, Ill.

New Construction in the Field

TEMPE, ARIZ.—It is the intention of the Consolidated Telephone and Electric Company to greatly enlarge its system at Tempe.

PINE BLUFF, ARK.—The Pine Bluff Telephone Company is installing cables, and preparing for long distance connections over the lines of the Telegraphone Company. Everything will be made metallic. The company is owned locally and managed by Mack Hammett.

AVISTON, ILL.—It is the Intention of the People's Telephone Company to construct a line from Aviston to Breese.

MAQUON, ILL.—The Maquon & Northeastern Telephone Company is considering the advisability of building a line from Maquon to Yates City.

CORYDON, IND.—Many improvements are being made in the lines of the Excelsior Telephone Company.

DES MOINES, IA.—The Mutual Telephone Company has purchased property for a new exchange building, in which will be established a new central energy system with a capacity for three thousand lines.

EDDYVILLE, IA.—The lines of the Eddyville Telephone Company are being extended.

MAQUOKETA, IA.—Many extensions are being made in the lines of the Maquoketa Home Telephone Company.

PERSIA, IA.—A line has been built from Portsmouth to Persia by the Mutual Telephone Company.

LEAVENWORTH, KAN.—The first story of the New People's Telephone building has been completed. Rapid progress is being made on the remaining part of the building.

CLOVER BOTTOM, KY.—The Fayette Home Telephone Company is extending its lines in Clover Bottom. It is also the intention of the company to build a line to Millville.

MONROE, LA.—The Home Telephone Company is preparing to move its office and exchange into a new two-story brick building and make other improvements.

BETHEL, ME.—A local telephone line is being built from Bethel to Northwest Bethel, and will later be continued to Gilead.

BOSTON, MASS.—The Boston and Albany division of the New York Central Railroad expects to install a complete railway telephone system from Boston to Albany, with a telephone in every station.

LYONSVILLE, MASS.—The Deerfield Valley Telephone Company is extending its lines in Lyonsville.

CALUMET, MICH.—The Tamarack Mining Company is constructing a private telephone system at the mine location.

CHARLOTTE, MICH.—The Citizens' Telephone Exchange is being moved into larger quarters.

DOWAGIAC, MICH.—Lyman Rogers and several others are considering the establishment of an Independent telephone line.

ISHPEMING, MICH.—The Marquette County Telephone Company is constructing new lines at Ishpeming.

MONTEVIDEO, MINN.—The Montevideo Telephone Exchange expects to have its new switchboard, which will have a capacity of 600 lines, installed by the first of the year.

BOLCKOW, MO.—The Mutual Telephone Company is making extensive improvements in this place.

NEW FLORENCE, MO.—The Farmers of New Florence will build a telephone line between Rhineland and McKittrick.

ROCK HILL, MO.—It is the intention of the Butler-Rock Hill Telephone Company to greatly improve its system at Rock Hill.

KEARNEY, NEB.—The Kearney Telephone Company has begun the erection of a new line to the Newark neighborhood.

CASSVILLE, N. Y.—New lines are being constructed by the Mutual Telephone Company at Cassville.

SCHENECTADY, N. Y.—Extensive improvements are to be made in the plant of the Schenectady Home Telephone Company, which will enable it to accommodate 2,000 additional subscribers.

KINNON, N. C.—The Home Telephone Company is to build a line to Richlands via Pollocksville, Maysville, Jacksonville and Catherine Lake.

COOPERSTOWN, N. D.—Many improvements are to be made in the lines of the Cooperstown Telephone Company.

MOORETON, N. D.—The Farmers' Telephone Company is building a line from Mooreton to Wahpeton.

NEW BREMEN, O.—Additional lines are being built by the New Bremen Telephone Company.

URBANA, O.—The directors of the Urbana Telephone Company are considering the advisability of installing a new system at Urbana.

ZANESVILLE, O.—The United States Telephone Company's long distance line between Zanesville and Cochocton is being rebuilt.

NORMAN, OKLA.—Many improvements are to be made in the exchange and system of the Norman Telephone Company. It is estimated that $7,000 will be spent for cable alone.

MEADVILLE, PA.—The Meadville Telephone Company, which has made many improvements in its system at Meadville, expects to establish a new exchange at Saegertown.

MIFFLINBURG, PA.—Many improvements are being made by the Buffalo Valley Telephone Company in its system.

GRAND SALINE, TEXAS.—The Mutual Independent Telephone Company is building a new exchange at Grand Saline, and will compete with the Southwestern Company.

LAWFORD, W. VA.—The Carter Oil Company expects to build a telephone line through Lawford, connecting Yellow Creek with Oxford.

REVELSTOKE, B. C., CAN.—The Revelstoke, Trout Lake and Big Bend Telephone Company has made connections with Arrowhead, B. C. The company also plans a number of other extensions to the surrounding towns. Address William Cowan, president, Revelstoke, B. C.

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Single copies, 10 cents. Subscription price, $1.00 a year. Foreign countries, $3.00 a year.

The American Telephone Journal

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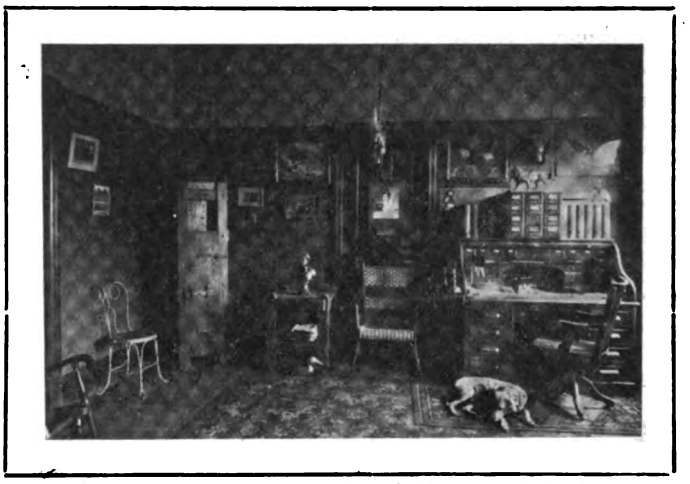
VOLUME XIV. SATURDAY, DECEMBER 22, 1906. NUMBER 25

A Modern Independent County Telephone Company

By Charles Wilkins.

THE maintenance of the power plants referred to in the previous installment of this article is under the the supervision of the wire chief at the head office at New Philadelphia, who inspects and makes periodical tests of all plants. The storage batteries are given particular attention, so that they may be kept up to the highest efficiency, and not allowed to become injured by improper charging. This method of handling the individual power plants has the advantage of economy and at the same time gives assurance that proper care will be given to this equipment, as the visits of the wire chief are made with sufficient frequency to keep him thoroughly in touch with local conditions. The company's wire chief at New Philadelphia is a man capable of handling the work which comes up in the entire territory, and he has full charge of maintenance work, everything done in this department being under his personal supervision. The records of all troubles are kept in his office.



Private Office of J. K. Johnston, General Manager of the Tuscarawas County Telephone Company.

Trouble men are directed in their work from the information furnished on appropriate trouble tickets, such as are used by nearly all exchanges. The tickets are numbered consecutively, and a record of trouble is made in a book, in case the tickets should become lost. The wire chief makes a report each morning to the manager. This report shows to the manager at a glance the trouble for the day previous, and the condition of the trouble at the close of the day.

Office Occupied by the Auditor and Cashier of the Tuscarawas County Telephone Company in the Main Building at New Philadelphia.

The manager uses this report also for another purpose, which is not only ingenious but exceptionally useful in many cases of complaint. To show this plan let it be supposed that a subscriber when he pays his bill wants a rebate (something which is never allowed) claiming that his telephone was out of order for a week or ten days. He is asked about what day that was. On receipt of his reply the report (which is kept on file) will be referred to and the manager is at once in possession of complete and accurate information bearing on the case. The subscriber sees that there is a check on his trouble, and immediately begins to back down in his assertion, saying that "possibly it was not out of order for a week, but he knew it was out of order," and agrees to settle in full.

All accounting is so far as possible centralized at the head office at New Philadelphia, which place is presided over by an auditor, cashier, toll clerk, general clerk and a stenographer. The duty of the auditor is to audit each exchange quarterly and to keep the accounts of the entire plant. The cashier does the billing, enters the bills in the lease record, and does the collecting at the New Philadelphia exchange. The toll records of the entire county are kept up by the toll clerk. The tickets from the other exchanges are sent in each morning by mail. All the billing is done by the toll clerk at New Philadelphia. The company's experience is that this is a very satisfactory way to conduct the tickets, as each morning the toll clerk has an opportunity to straighten out any errors or discrepancies in the tickets of the day before. If any are noted corrections can in most cases be readily and satisfactorily made, as all details are likely to be fresh in the memory of the operators who handled the connections. The reports of the plant are made quarterly to the board of directors by the auditor.

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The increase in the number of subscribers presents some very interesting features.

Since the rebuilding of the plants throughout the county, and the adoption of party line service, the demand for telephones has been greater than prior to this time. The company has at the present time over 300 contracts from those who are anxious to have its service and waiting to be connected.

So well are the advantages of the service of the company understood, and so strong and continuous has been the demand for service by new subscribers, that it has not been found necessary to do any soliciting at all. In fact it has never employed anyone for the purpose of soliciting for the company, other than to rewrite contracts from the old to the new service. There has been some advertising placed in the local papers, and General Manager Johnston states that he considers these a very good medium for advertising his business.

Recently there was put in operation a special scheme at New Philadelphia for the purpose of increasing the list of subscribers, which is meeting with exceptional success. The company has offered a prize of a $50 bedroom suite to the person securing the most contracts for the four months ending December 31. The second prize is a free telephone for one year. One business man in New Philadelphia has secured, up to date, twenty-three contracts. There are a number of competitors for the prize, and interest is keenly felt by all the people of the town. The accompanying reproductions of a leaflet advertising the plan and a photograph of the first prize, as it was exhibited in a well located show window in the town, will give a sufficient indication of the methods adopted for the inauguration of this plan, and giving it the necessary publicity.

The company owns and operates all rural lines, over which it gives free service. As a means of promoting the proper regulation of the use of these lines it was decided to send out to each subscriber on a rural party line a copy of the following letter:

Aerial Turns in Principal Cable Leads, Which Replace Old Construction Which Carried Seven Arms of Open Wire.

DEAR SIR:

"As we are mutually interested in making the telephone service as beneficial and convenient as possible, it occurs to me that a few suggestions on the subject will be productive of good to all concerned.

"You will doubtless agree with me that by reason of the extremely low price charged for the service it is absolutely necessary that we have a number of stations on one line, and each subscriber should, therefore, confine his use of the telephone to the shortest possible time necessary to obtain or get the desired information, and then promptly "hang up" so that the next party can have the use of the line.

"Avoid use of the line by children, as they take up valuable time unnecessarily. It makes no difference to this company how much or how long you use the line, the subscribers themselves being the losers by lengthy holding of the line by any one person.

"You are also aware of the fact that if you take down the receiver when another is using the line the conversation may be heard by you, and this is where the Golden Rule comes in: "Do to others as you would wish them to do to you if you were holding the line."

"I shall at all times be greatly obliged to you if you will advise me of the use of any improper language by anyone over the telephone. I shall also be glad to receive any suggestions.

THE TUSCARAWAS COUNTY TELEPHONE COMPANY

NOTE.—The subscribers will confer a favor on the management by answering the following questions, which are for the betterment of the service.

.....Exchange

Date .....

Telephone No. .....

Mr. .....

.....

Do you hear well over the line?.....

Do others hear you well?.....

Is the line quiet or noisy?.....

Is the operator prompt in answering?.....

Are operators courteous and pleasant?.....

How is the day service compared with the night service?

.....

How is the service generally?.....

Remarks .....

.....

.....

.....

Form Sent Out to Direct Subscribers in Their Comments on the Service.

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"When you are in the city, call at the exchange and we will be glad to see you." Yours very truly,

GENERAL MANAGER.

The growth of toll line business has been steady, a regular increase being shown from month to month. The Independent company handles nearly all local toll line work, the Bell company only getting the toll business to points which are not reached by Independent lines. These are now comparativey few in number, and such calls are becoming less and less frequent, as the lines of the long distance company are extended, and connections made with other local companies.

The method adopted to encourage the use of toll lines is simply the giving of good service. Some advertising is done, but this part of the business seems now to be established on a sound basis. The company has added several new toll line circuits within the past year and several new toll line stations have been opened.

Collections, the most unsatisfactory subject with which the average manager has to deal, are ordinarily handled without friction, and bills are promptly met in this territory. An examination of accounts shows that the company had accrued in New Philadelphia rentals for the quarter ending June 30, $4,100. For the quarter ending September 30, $4,500. The amount outstanding at the end of the quarter of June 30 was $27.50, which made the percentage 98 3/5 per cent. The amount outstanding September 30, 1906, was $17.50, which made the percentage of collections for the quarter 99 5/10 per cent. The balance outstanding was perfectly good, as shown by the fact that it was all collected before October 5.

CHIEF OPERATOR'S REPORT

_____ Exchange

_____

.....190..

General condition of switch-board.....

.....

.....

Condition of toll-board.....

.....

Was all line trouble given due attention.....

.....

.....

No. of switch-board cords repaired.....

No. of switch-board cords not repaired.....

No. of complaints from subscribers.....

Fire alarm turned in from telephone No.....at.... ..M.

.....

.....

No. telephones installed.....

No. telephones taken out.....

Remarks: .....

.....

.....

.....

.....

.....*Chief Operator.*

NOTE:—Report in the remarks all matters of importance or interest that the Manager ought to know.

Daily Report Made Out by Chief Operator.

This is a point to which a great many telephone companies do not give enough attention. The stand taken in this matter by the Tuscarawas County Telephone Company, General Manager Johnston states to be: "First to furnish good, efficient telephone service, and then get our money." Collections are quarterly, in advance. While, of course, it is not possible to collect all of it at the first of the quarter, it is customary not to allow any subscriber's account to run a longer period than ten days into the second quarter. As a means of reminding slow-paying subscribers of their obligations the following letter is sent them:

"It may not have occurred to you the importance of paying your telephone bills promptly upon presentation. We cannot pay accounts due others from us unless we receive accounts due us. Our accounts are made up of a multitude of small bills, which to the subscriber is of minor importance, but in the aggregate it is of vast importance to us.

(*Continued on Page* 405.)

EXPANSION.

It is the purpose of the management of the Telephone Company to extend the use of the telephone in New Philadelphia to every person whose income will permit him to ride on a street car.

We are offering the following prizes, from this date up to December 31st, to any person that will secure the largest number of contracts or will give us the information that will lead us to secure a contract for a telephone within the corporation limits of New Philadelphia. You do not need to secure the contract yourself, but if you hear of any one talking about putting in a telephone, and if you will furnish us with his name and address, we will send a solicitor, and if we secure the contract and install the telephone, we will give you credit for it just the same.

Your chances are equal to secure the prizes. Begin now. If you have not already a telephone, install one in your house, which will add one to your list. Speak to your neighbors about installing a telephone. Show them our directory. Point out to them the advantages of having a telephone in their house—the protection it affords them and the convenience. A telephone is not a luxury—it is a necessity. Get busy and win the prize.

The first prize is a Fifty Dollar Bed Room Suite; second prize, a telephone in your residence, free for one year.

For information call telephone number 98.

TUSCARAWAS COUNTY TELEPHONE COMPANY.

Advertising Leaflet Sent Out to Draw Attention to Contest for Increasing Number of Subscribers.

The Window Display for the Prize Contest.

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Creating Business on the Farmers' Lines

By L. A. Parrish, Special Correspondent.

A NEW idea in telephony for profit has just been developed by General Manager Gansey R. Johnston, of the Columbus Citizens' Telephone Company. Like many other new experiments, it will have to be tried and carefully tested before it will come into general use, but there is no doubt in the minds of Mr. Johnston and of the enterprising merchants of the city, that the experiment will prove a success. It is believed that it will put money into the pockets of the farmer patrons of the telephone company and incidentally put two telephones where but one has flourished before.

The plan is simply to educate the farmers to the idea that the telephone and the telephone directory are instruments for creating business rather than for furthering pleasure and making visits. He seeks to have each farmer place alongside his name in the new telephone directory the name or names of the specialty he has to sell whether it be chickens, fruits, stock or potatoes. Then when Mr. Brown of this city wants perhaps an extra turkey, duck or chicken for his Sunday roast, he will look in the telephone directory and will find the name of "John Jones, poultry in all seasons, Dublin Road 93122," and the matter is solved. He orders his fowl and it is brought to him by Farmer Jones on his next trip to the city.

Manager Johnston has sent out several hundred letters to the farmers in the vicinity of Columbus as follows:

"In the latest issue of the Columbus Citizens' telephone directory is a list of rural line subscribers. We have sent most of a new directory to the press. In this will be a similar list, which will show also the direction or road taken by these lines. I think of putting at the head of this list a little reading notice as follows:

"Most of the persons named in this list are farmers, and most of these farmers have produce to sell to dealers or consumers in Columbus; potatoes, apples, berries, poultry, eggs, butter, hay, grain, live stock, and so on. Many of them also have stands in Columbus markets. Many buy and sell horses and take them for pasture. Altogether they serve the residents of Columbus in more ways than we can here enumerate. At this time the telephone company has no list of those prepared to fill telephone orders, but there seems to be no reason why trade may not be greatly facilitated between producers and consumers of farm products in Franklin county by the more frequent use of the telephone.

"I have been trying to consider the matter from the farmer's standpoint. It looks as though the telephone can be used to much greater advantage by the buyers and sellers of farm products than it has been, especially if the sellers make themselves known to and easily reached by the buyers. There are few articles of trade that offer better profit in direct dealing between producer and consumer than the perishable farm and garden products, with their wide variation in quality. For few other things is the one so pleased to pay the price the other is pleased to receive. There is an immense commercial machinery for the handling of the large and less perishable crops. The machinery for distributing those which must be used more quickly and nearer home is probably ample; but in respect to direct communication and delivery, I do not think it is utilized nearly as much as it might profitably be used. More than half the messages handled into and out of Columbus by the Western Union Telegraph Company relate to buying, selling and prices. A very much smaller proportion of the telephone messages relate to trading—I think because the telephone has not been in use so long.

"It is the practice to treat farm telephones as residence telephones. What I think may pay is to treat these telephones as business instruments, and show the nature of their business in the telephone directory. This would mean appropriate wording after the name in the alphabetical list, insertion under an appropriate heading in the classified business list, and mention of the produce for sale in the special list of rural lines. The rural line list is in the directory for the telephone company's own purposes. It might be made the most valuable of advertising for the farmer.

"Too much of the directory has gone to press to permit any changes in the body of it. There is opportunity to write up the rural-line list in any way that may be decided upon within the next week. As an experiment we are willing to insert in this list for one issue of the directory a line of words or phrases not exceeding three, taken from the attached form of application, for any of our rural line subscribers who may be selling produce in Columbus to any considerable degree and who will sign this application in good faith.

"As the time is short I am taking this matter up through this circular letter. It is sent to all persons on our party-line lists. If we have made a mistake in addressing it to you, or if it is not of interest to you, kindly destroy the letter or pass it to a neighbor who you think may be interested.

"Another feature of the service that I imagine will bear expansion is the use of telephones at the market stands in Columbus. Many of those who have telephones on their farms cannot be reached by telephone at the markets where they have regular stands, or if they can be reached, others are not aware of it. It looks as though the farmers interested might profitably subscribe for additional instruments or make use of existing instruments for receiving calls. This would involve some going back and forth or some messenger service. The regular extra name service rate in connection with the use of another's telephone is six dollars a year; this would include the insertion of the market stand number in the rural line list, as well as in the body of the directory. We will put a market stand number on the same line with the name in the alphabetical list for three dollars a year. The approval of the subscriber for the telephone whose number is used is always required.

"Besides commission dealers, grocers, restaurants, and others who buy to sell again there are certainly large numbers of boarding houses and housekeepers who would be pleased to order their produce by telephone. There ought to be satisfaction and profit in bringing into the city supplies for which there is an assured delivery at a known price."

MEETING OF THE SOUTHEASTERN IOWA TELEPHONE ASSOCIATION.

ABOUT forty delegates were present at the November meeting of the Southeastern Iowa Independent Telephone Association at Washington. The number of telephones represented was estimated to be about 22,700. Many interesting points were brought up in discussion by members of the Association who were present, among whom were the following: C. A. Hollis, of Hudson, Ia., representing the Mutual Association of northeastern Iowa; G. T. Hewes, of Des Moines, representing the Clearing House; E. E. England, of Mt. Pleasant, president of the Association; Mr. Stafford, of Pella; Mr. Whittaker, of West Liberty; Mr. E. H. Sidwell, of Iowa City, and Fred Dupies of Sigourney.

INDEPENDENT COMPANY AT TOLEDO NOW FAR IN ADVANCE OF ITS COMPETITOR.

IN spite of the special inducements made by the Bell people in agreeing to install telephones three months on trial free of charge, The Toledo Home Telephone Company, of Toledo, O., made a net increase of 317 telephones for the quarter ending September 30. For the month of October, the net increase was 114 new telephones. To-day the Home company has in operation nearly 12,000 telephones. The company has had a most wonderful growth, every month showing a marked gain. A bit of history may not come amiss here as it shows the wonderful progress that this Independent company has made since its entrance into the industrial life of the city. When the Home com-

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pany began soliciting for business in 1900, the Bell company had a list of about 2,300 subscribers. The Home plant was set in operation in September, 1902, when it had a list of between 3,000 and 3,500 subscribers, which has steadily grown to over 11,000, while the Bell list has grown to only about 6,000 subscribers, this estimate being taken from the last directory gotten out a short time ago. No stronger evidence of satisfaction with the service of an Independent company could be presented.

How to Improve Telephony*

By W. Duddell.

THE loudness, and articulation or clearness of transmitted speech, and the distance over which it can be transmitted, are the main directions in which improvement in telephony is required. The questions, how Mr. A. in London shall get connected to Mr. B. in Glasgow with the minimum of loss of time and temper, and how to find the number of the person you wish to communicate with, when his entry in the directory, in small type, is sandwiched in between two advertisements, are questions with which I do not propose to deal—not that there is any lack of room for improvement in these directions.

Before proceeding with our subject, it will be necessary to consider briefly what constitutes sound, and more especially articulate speech, so as to form a clear idea of what we want to transmit. The sensation of sound, as is well known, is produced by the vibration backwards and forwards of the particles of the air about their position of rest, and the character of the sound depends on the quickness and the form of the vibrations. Thus, in the case of a musical note, the air particles vibrate in a perfectly regular manner, and the number of complete vibrations in a second, or the frequency, determines the pitch; and the amplitude, or distance the air particle moves from its position of rest, determines the loudness of the note. In speech, however, the vibrations are very complex, and in order to form any clear mental idea of their character, it is necessary to represent the move-

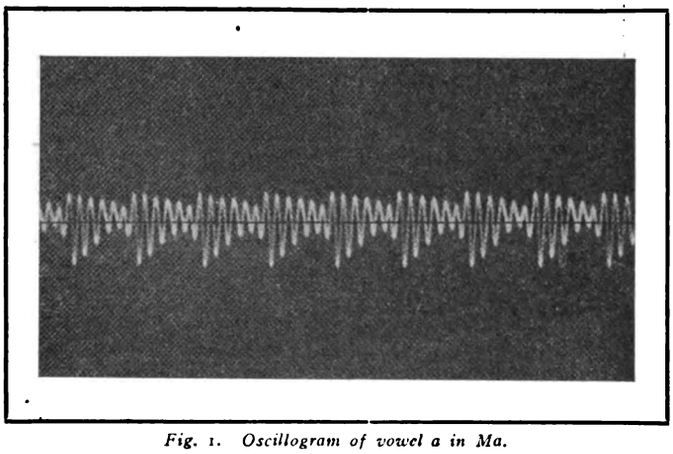

Fig. 1. Oscillogram of vowel a in Ma.

ments as curves, which I will call sound patterns. Various observers have made records of these patterns; among the earliest and best, are those obtained by Fleeming Jenkin, and Ewing (Edinburgh Phil. Trans.), who magnified the impression obtained on the cylinder of a tin-foil phonograph. Figs. 1 to 6 are some typical sound patterns obtained by another method, to be explained later, which illustrate how very complex the movements of the air particles become in the case of speech.

The problem in telephony is the accurate reproduction at a distance of these complex vibrations of the air: the more nearly the movements of the air at the receiving point correspond to those at the transmitting point, the better will be the quality of the telephony. If the movements at the receiving station are similar in pattern but of less amplitude than those at the transmitting station, then we have simply attenuation of the sound; if, however, the sound pattern at the receiving point is distorted, then loss in articulation takes place. It happens, very luckily, that the ear has a wonderful power of recognizing a sound pattern even when considerably distorted; if it were not for this latitude, as we may call it, in transmitting our sound pattern, telephony would not be practicable over anything like the distance already attained.

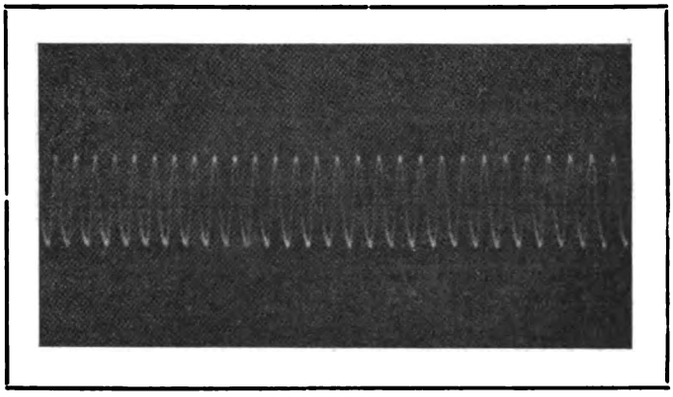

Fig. 2. Simple form of oo sound in Coo.

Let us now come back to electric telephony, and examine what takes place between the original air movements and their final reproduction at a distance. The movements of the air are first converted into movements of a diaphragm, which movements are again mechanically transmitted to the carbon grains in the microphone, thus altering its electrical resistance. The varying resistance of the microphone causes the current through it and the conected transformer to vary and so induces varying currents in the secondary of the transformer. This secondary is connected to the line, so that the currents are conveyed to the receiver at the distant place. The currents are here transformed into a varying magnetic field which acts on a diaphragm and causes it to vibrate and thus start the air around it in movement. In all this long train of transmissions and transformations the character of the original sound pattern must be preserved sufficiently well to enable the ear to recognize it in its final form. When we consider that at every one of these steps distortion and loss of energy must take place, it is not surprising that there are difficulties in the way of telephony. In fact, it is a matter for wonder that electric telephony is possible at all.

Telephony has already reached a very high degree of excel-

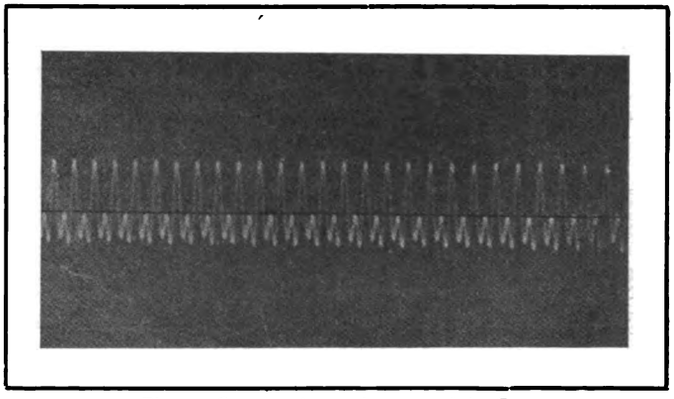

Fig. 3. Complex form of oo sound in Coo.

lence, how can it be improved? At every step in the long train of transformations we must inquire: What are the losses? What are the distortions introduced? How can we avoid them? An-

*Abstract from a paper read before the members of the Royal Institution, London.

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swers to these questions can only be given by systematic accurate measurements and experiments.

If one consults the literature on telephony, one is surprised how little quantitative data is available on any given point in comparison with that in other branches of engineering. Experimenters of late seem to have avoided telephony; dozens of investigations are published on the efficiency of induction motors, and hardly one on the efficiency of telephone induction coils; yet while the former are made in thousands, the latter are made in

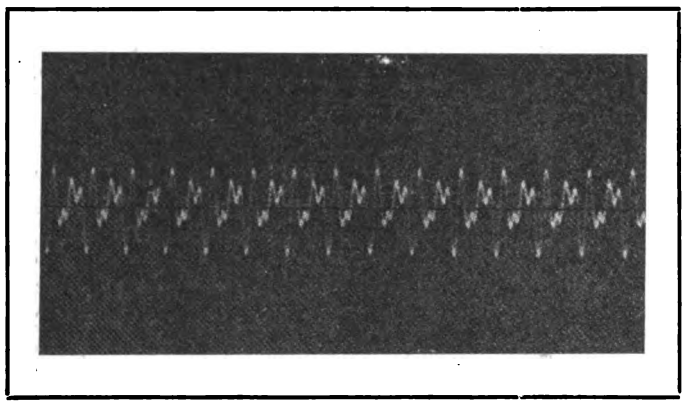

Fig. 4. Vowel o in Ho.

millions. Telephone engineers are not wholly to blame for this state of affairs: the difficulties of making the measurements and the lack of suitable apparatus have largely contributed to it. In what follows, I propose to draw attention to some existing apparatus and methods which can be applied to this purpose.

An investigation has been recently made by Professor P. E. Shaw on the amplitude of the movement of a telephone diaphragm by means of an extremely sensitive micrometer which he has devised. I will cite one result as showing how extremely small are the quantities with which we have to deal in telephony. He finds that the movement of the diaphragm corresponding to a just comfortably loud impulsive sound is only one twenty-thousandth part of a millimetre, and that something less than one-fiftieth of this is still just audible.

The diaphragm has a frequency of vibration of its own which in ordinary receivers may be about 500 complete vibrations per second; it will therefore tend to reinforce (due to resonance) notes having the same frequency as itself, i. e. about the octave above middle C. This leads to the very unpleasant accentuating of certain notes, when music is transmitted telephonically. It seems as if this might be overcome by applying some form of damping to the diaphragm or by making its frequency of vibration very much higher.

To test the electrical part of the apparatus, we require some

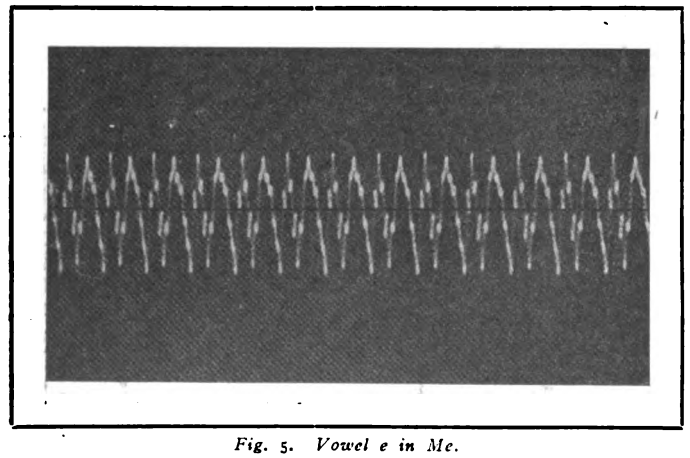

Fig. 5. Vowel e in Me.

means of measuring small alternating currents of fairly high frequency and also some method of producing these currents. At first sight it would seem comparatively easy to construct an alternator to produce these currents, as the highest frequency does not exceed about 2,000 periods per second, and alternators have been constructed to give very much higher frequencies. The real difficulty is to obtain a machine which will give a strictly sinusoidal current under all conditions. This is necessary to enable the experimental results to be easily compared with theory.

There are other methods of producing high-frequency currents, such as: (1) the Humming Telephone; (2) the Musical Arc; (3) the Musical Vacuum Tube, which is produced by shunting a vacuum tube, supplied with high voltage *direct* current, with a condenser and self-induction in series in a similar way to the musical arc; (4) the vibrating bar of Mr. Campbell which works in a manner analagous to the electrically maintained tuning fork, except that the contact is replaced by a small microphone. This latter apparatus gives a very constant frequency and current.

Although electro-magnetic instruments such as dynamometers have been constructed sufficiently sensitive to measure telephonic currents, the relatively high self-induction of these instruments has prevented their general application. Practically all the instruments which are at present being applied to the measure of high-frequency currents are thermal instruments, that is to say, they depend for their action on the heating produced by the current when it flows through a suitable small high-resistance conductor. These instruments may be broadly divided into three classes, according to whether the rise in temperature of the conductor and consequently the current is measured by (1) the expansion of the conductor; (2) the change in its resistance; (3) the E.M.F. of a thermocouple either forming part of or near to the heated conductor.

The first method, viz., the use of the expansion of the conductor as a measure of the current, has not up to the present lent

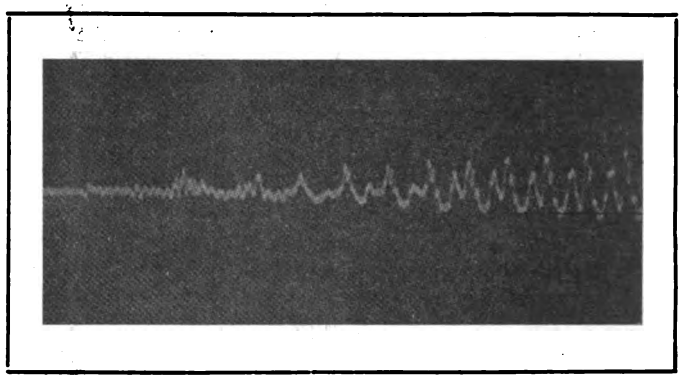

Fig. 6. K and first part of e in Key.

itself to the production of very sensitive instruments. The second and third methods above have each given instruments of high sensibility such as the "barretter" employed by Dr. Kennelly, and the thermo-galvanometer. From the point of view of ultimate sensibility there is very little choice between these two instruments, but the simplicity and ease of standardization of the thermo-galvanometer make it the more convenient in practice.

Some very interesting results have been obtained by Dr. H. V. Hayes on the attenuation of the current through cables and long overhead lines, and on the improvement that can be obtained by adding self-induction to the line. These experimental results amply bear out the theoretical conclusions of Heaviside as to the great advantage of increasing the self-induction, or "loading" the line for long-distance transmission. The great importance of avoiding reflection of the current at the terminal apparatus, and the means of reducing it by the use of a "terminal taper" is also very clearly shown. It is greatly to be hoped that these investigations will be actively pursued, and a satisfactory design of loading coil will be developed, as increasing the self-induction of the circuit gives great promise of successfully increasing the length (now limited to about 50 miles) of subterranean or submarine cable through which telephony can be commercially accomplished.

So far the methods of measurement dealt with only give the root-mean-squared or heating value of the current. To inves-

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tigate the distortion in the sound pattern when translated into a varying electric current as it flows along the line and through the different pieces of apparatus, we require to be able to record the current at every instant and also at two or more points in the circuit. This can be easily accomplished by means of an oscillograph, and the sound patterns given at the commencement of this discourse were thus recorded. Mr. A. Blondel, and the Engineer-in-Chief of the Post Office, Mr. Gavey, have published many results obtained in this way.

A more complete insight into the distortion produced by different parts of the apparatus and line can be obtained by gearing small mirrors to both the transmitter and receiver diaphragms, so that records can be obtained simultaneously of the movement of the transmitter diaphragm, the current flowing into the line or cable, the current flowing out of the line, and the movement of the receiver diaphragm.

There still remains much work to be done in devising new methods of measurement, and in improving the present apparatus; nevertheless the existing methods and apparatus are already sufficiently perfect to enable a large number of investigations to be successfully undertaken.

If the necessarily brief references to the complex problems of telephony and the resumé of the methods of measurement available to attack them which I have given to-night should inspire any of our engineers or scientists to undertake systematic quantitative measurements with a view to improving the transmission of sounds and speech, then this discourse will have accomplished its aim, and, I think, justified its title.

A MODERN INDEPENDENT COUNTY TELEPHONE SYSTEM.

(*Continued from Page 401.*)

"We hold ourselves in readiness to serve you at all times, both day and night, and in order to accomplish this, for your benefit and our advantage, the bills for such service should and must be paid upon presentation. It is the policy of this company to give prompt and efficient telephone service, and we shall, in the future, insist upon prompt payment of bills due us.

"We want all of the customers we can get, but unless they pay for the service given them they are an expense rather than a benefit. I would personally appreciate your assistance in this matter and hope that your accrued and accruing bills will be settled upon presentation, and hope that we may have your hearty co-operation in accomplishing the end mutually desired."

This company has made what may undoubtedly be considered a marked success in the development of its field. The management is in the hands of men who are well known for their ability in the management of telephone properties, and highly regarded in the territory in which the company operates. The officers are as follows: President, Chas. H. Slingluff; vice-president, J. K. Johnston; treasurer, John L. Kennedy; secretary, Edgar A. Walter; directors, Chas H. Slingluff, J. K. Johnston, John L. Kennedy, Edgar A. Walter, E. D. Moody, Jas. S. Brailey, Jr., Jas. E. Brailey, Geo A. Beers, E. R. Van Ostran, C. D. Juvenal, J. M. Blatt.

A high standard has been set in all the work of the company. That this is the best policy is clearly indicated to be the belief of the general manager in the following statement furnished by him as a suggestion to managers of other Independent companies who may read this article:

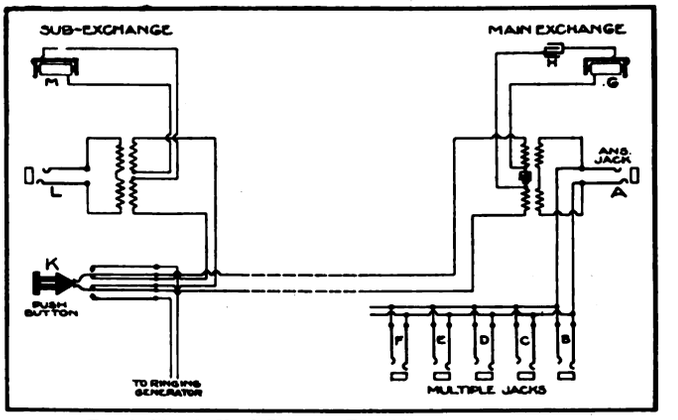
"From practical experience we find that it is the best policy for any telephone company, in constructing and rebuilding, to buy the best material, and to secure the best labor, and to have the work done in the very best possible way. When one takes into consideration the maintenance of a telephone plant, the first cost is a small item. For an example: The maintenance of this plant for 1905 was $9,236. This maintenance has been reduced 2/3 while under course of reconstruction, so that a fair estimate for the entire plant during the coming year will probably not exceed $2,000. This may look small to the average telephone man, but when we give this figure, we give it on the basis afforded by New Philadelphia as a criterion, which shows the maintenance account for the past three months, including ½ the wire chief's salary and ½ the trouble man's salary, this being divided because he was not used over half the time on trouble. The material used in the maintenance shows an amount of $196.50 for the months of July, August and September. The manager gets his reward by knowing that the service furnished to the subscribers is A No. 1 and the gratification which comes from observing that the complaints of the subscribers to the manager are very few."

A TRUNK CIRCUIT.

By R. H. Polk.

MUCH interest has been taken by the author in several novel circuits that have been shown in the American Telephone Journal from time to time, and especially those covering trunking circuits between exchanges. In all of the circuits that have been shown the earth forms a part of each circuit.

It was the writer's trying experience to have charge of a company that had several exchanges and which had a trunking circuit with the earth connection between exchanges seven to twelve miles apart. There was electric car service between the cities, and, as is often the case, there was considerable leakage from the electric railway. The trunking circuit using the earth connection was a failure, as the leakage would sometimes add 25 to 40 volts to that already on the line or oppose the battery on the line with approximately the same amount. In order to meet the demand for a reliable trunk circuit a magneto drop metallic circuit was installed, but as the main exchange had a large multiple board and each trunk was multipled so as to be available for each operator, much trouble was experienced from the operators' ringing in multiple jacks *B, C, D, E, F,* and causing the answering drop at the answering position to fall each time the sub-exchange was called. The writer found by experimenting that a condenser put into the drop circuit would obviate the trouble. By reference to the diagram it will be seen how the condenser *H* was put in the circuit of drop *G*. By doing this any operator in the main exchange could signal the sub-exchange and throw the drop *M* at a distance of twelve miles and not disturb drop *G* before answering operator of the main exchange.



Trunk Circuit Used Between Two Magneto Exchanges.

It was found by experimenting that the condenser *H* should have a capacity of from ¾ to ⅞ of a microfarad, depending somewhat on the resistance of the line. This circuit worked very satisfactorily for several years and is still being used with an improvement of clearing out each way which will be described later. This circuit has been submitted to several engineers, and all have said that theoretically the drop *H* must fall whenever ringing current is applied at any of the jacks *A, B, C* or *D*. The only explanation which the author can offer is that the impedance in the circuit of drop *G* is higher than in the circuit of drop *M*, including the 12 miles of metallic line.

Editor's Note.—Mr. Polk, who is general manager of the Memphis Telephone Company, will be thought by many engineers to have applied this remedy to a circuit which has electrical constants so proportioned as to make the success of his plan in other similar circuits of different lengths rather doubtful. It would be interesting to have a theoretical discussion of this matter, with a mathematical consideration of the reasons for the action he describes, and the effects of varying the length of line, capacity of condenser, etc. The editor would be pleased to receive such material for publication.

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THE EDITOR'S PAGE

PENNSYLVANIA AGAIN IN THE LEAD.

VISITORS to the Chicago convention will recall the prominent part in telephone development claimed for the Keystone State by its enthusiastic delegation. That Pennsylvania still has a few telephone novelties up its sleeve is indicated by the latest reports. The application of this means of communication to business and social affairs seems to have gone so far that almost the only possibility is the extension of uses which have already been discovered. Not so, however, in the field of sport. And it is in this field that the Pennsylvania telephone users have shown their generalship. When they were ready to start in on this line they were bound to do it on no small scale. Nothing less than the best obtainable would suffice. And when it comes to finding out what really is best, who can go beyond a bear hunt?

Not long ago one of the orchards in a Pennsylvania rural community was visited by a bear who was helping himself to the fruit when first seen by the farmer's wife. Immediately the telephone was brought into use, men at neighboring farms were notified, and when the bear started back to the woods he found his retreat cut off by the men with their rifles. Bear steak was served in twenty-two farmhouses that week. Oh, the indispensable rural telephone!

GETTING AT THE DETAILS OF THE BUSINESS.

WHAT appears to be another genuine and rightly directed step in the line of progress is recorded in the report of the organization on a permanent basis of a new association of Independent telephone managers in Michigan. This association is different in its aims from the other organizations familiar to Independent telephone men in that its object is primarily to increase the general knowledge and efficiency of the individuals who have taken this means of strengthening such affiliations as already exist. The relations which are to be thus built up have as a basis a more strictly personal element than is commonly found in the familiar district and state organizations. While papers and discussions are to be devoted to the consideration of questions having the most direct practical bearing upon the matters arising in the course of the routine transaction of telephone business, the interests of the companies are not to be brought strongly forward, but rather the interests of the men themselves. In brief, the meetings are to partake especially of the character of those of a technical society, instead of having a trend toward the betterment of purely local business conditions.

Such a society when enthusiastically developed and heartily supported must inevitably bring forth results which will give to its proceedings not only a strong local value, but an influence of generous breadth. It will be a sort of clearing house for knowledge, where information of true value will be carefully weighed against the results of experiments which lead to false conclusions, and the knowledge based upon genuine fact will achieve most speedy recognition. The varied employments of the members will go far to insure the bringing out of the most complete significance of the methods discussed, and yet tend to curb all inclinations to consider the development of an idea to an extent unwarranted by practical conditions—the latter a fault committed with some frequency in gatherings of specialists on a single subject.

From what is known of the first proceedings of this association, and of the abilities and purposes of the men who have formed it, it would seem to be a society which will bear watching as an example. In Michigan it fills a need which is felt with equal force in many other places. All telephone men, everywhere, need to know more about their business than they do, and the brightest men are looking for the best means of increasing this knowledge. They have not overlooked the value of a society devoted to a discussion of the problems confronting a telephone man from what—in spite of the fact that such problems include such business transactions as collections and obtaining rights of way—may be considered a purely technical standpoint. In Boston and in New York, at least, such societies have been established by employees of the Bell companies on what seems to be a firm basis. As might be expected, however, their proceedings are principally limited to the discussion of matters related more directly to operating and engineering work, so that in a measure they miss the full breadth of their opportunities. In general, however, it would appear that telephone men have been deterred from this form of co-operative study of their work by the apparent difficulties, and doubt as to whether they would individually gain sufficient benefit to compensate them for the efforts expended. The Michigan association will therefore be watched with a great deal of interest in many parts of the country, and it is to be hoped that when it has proved its value the development of similar plans will follow in many localities.

THAT MAINTENANCE ACCOUNT!

AS swings the balance between maintenance and construction accounts, so vary the dividends. The determination of the exact amount of outlay for construction which shall insure the least total annual charges is admitted to be one of the most vexatious questions which must be answered when a new plant is to be built, or an old one reconstructed. The question cannot be dodged—some answer has to be made, and if it be wrong it is too late to repent when the wires are working.

This is why information based on valuable experience is so eagerly sought. In an article presented upon another page of this issue is stated the opinion of a prominent general manager, which runs practically to the effect that no precaution in construction should be neglected if the result will be a subsequent lowering of the cost of maintenance. This opinion is stated in the strongest terms, and the facts presented in the same article indicate that he has been willing to spend money to back it up. The results which are said to have been obtained already go far toward proving the worth of his contention.

The era of false economy by the purchase of equipment which is obtainable at a price insufficient to cover the cost of good material and workmanship is rapidly passing. Such equipment represents a lower cost for material, but any saving made at the start is soon made up by the expense of keeping it working. It not only requires continuous expenditures for labor, but requires more skilled labor, which is high priced, than a smooth running plant where troubles are infrequent..

This matter of maintenance is a two-edged sword that cuts sharply both ways. If the telephones and lines are out of order the best operators in the world cannot give good service. The company with the best plant is the one which is prepared to get the most business. Manufacturers of material are anxious to see a high standard set by the operating companies, and managers should lose no opportunity of impressing upon their stockholders the soundness of the policy of buying the best at the start. The merit of such a policy is fully borne out by the experience of the best men in the field, who nearly all endorse it heartily.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN.

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

ADVANTAGE OF DOING BUSINESS AS CORPORATION IN ILLINOIS.

Is there any advantage that a corporation has in doing a telephone business in the State of Illinois over an individual? The cost of incorporating is considerable and we do not wish to incur it unless we get some substantial advantage by so doing. F. T. F.

THE advantage which is peculiar to a telephone company and is not possessed by an individual doing a telephone business is that the corporation has the right of eminent domain and this right is not conferred by the laws of Illinois upon an individual. There are, of course, many other advantages of doing business as a corporation, chief of which is the absence of personal liability, but we do not understand you to be inquiring about the general advantages of incorporation. On the subject above referred to, see Village of London Mills v. White, 208 Ill. 287; 70 N. E. 313.

MAKING A CONTRACT BIND A COMPANY AND ITS SUCCESSORS.

Is there any way to make a contract with a telephone company that will bind a successor to carry out the provisions of such contract whether such successor buys the property and does not transfer the stock, or buys the property or stock and allows the purchased plant to dismantle or become insolvent and buys in? Or perhaps to be more explicit, can a contract be made so it will bind both the property and stock for its execution? Can it be made so it will bind the stock property and its successors as individuals for its execution? Can it be made to follow ownership under any conditions? J. D. J.

A CONTRACT with an incorporated company is binding upon the company no matter who are the owners of the shares of stock. If the property of the company is sold to a purchaser who does not acquire the stock, the contract is not binding upon such purchaser unless he voluntarily assumes it. The only way that the property of a company can be made so liable for a contract executed by the company that it will be bound in the hands of a purchaser in good faith, is by the company giving a mortgage, either chattel or real estate, to secure the performance of the contract. The mortgage being upon record is notice to the purchaser of the property and, if he takes it, it is subject to the contract it has been made to secure. A contract with a telephone company that is incorporated can only be made binding upon the stockholders individually by their personally guaranteeing its performance in writing. Neither a company nor an individual can dispose of its property in fraud of its creditors and if the contract has made the other party a creditor of the company or the individual and property is transferred fraudulently, the transfer can be set aside. For a transfer to be fraudulent it must be made without consideration and in bad faith. Such a transfer can always be set aside by applying to the courts.

TAPPING TELEPHONE WIRE TO GET DIVORCE EVIDENCE.

PERSONS contemplating divorce proceedings must be wary hereafter of the detective who gleans his evidence from "tapped" telephone wires. Arthur S. Tulloch was recently arrested in Chicago while seeking for evidence in this way. He gained admission to the basement of the Tacoma Building disguised as an electrician on the pretense that he wished to repair a line. His attempts with several instruments to "connect" with the wire that led into a neighboring drug store aroused the suspicion of the engineer of the building. He notified the telephone company, which sent men to investigate. The investigation led to the arrest, and Tulloch on being questioned, admitted that he was spying upon a woman who appeared in a neighboring drug store every evening and talked over the telephone about a divorce she was interested in.

NEW YORK HIGHWAY RIGHTS NOT CONTINUOUS AND EXCLUSIVE.

THE motion made by the State Line Telephone Company in a suit against the City of New York, for an injunction to restrain the latter from interfering with certain poles in the village of Carmel, Putnam County, N. Y., has been denied. The following is a copy of the Justice's decision:

"Motion denied on the authority of Eels vs. The American Telephone & Telegraph Company, 143 N. Y. 133. Considering the locality and the use to which the abutting property is dedicated, the public easement in the highway does not include any right in the plaintiff telephone company to appropriate any portion of this highway to its own continuous and exclusive use."

MILLION DOLLAR LAW SUIT.

THE National Telephone Manufacturing Company is complainant in a suit at Boston, Mass., against the American Bell Telephone Company and is seeking to recover one million dollars for an alleged false and malicious prosecution. The complainant was sued August 5th, 1895, for the alleged infringement of a patent, and this is the prosecution for which it seeks reparation. The defendant in the present case has asked the appointment of an auditor, alleging that there are too many important matters to be inquired into for the case to be passed upon directly by the court.

CONSENT OF COURTS TO FRANCHISE.

In our state (Kentucky) we understand that the county court is authorized to permit the construction of a telephone line. Some business men tell us that the consent of the county court is not enough. If so, what further authority must we get? C. C. R.

IN Kentucky the county court cannot authorize the construction of a telephone line without the consent of the fiscal court. That is in accordance with the statutes and decisions of the State. Ky. St. 1903, Secs. 4306, 4679, Bevis v. Vanceburg Telep. Co., 89 S. W. 126.

TAXATION OF CONDUITS IN MAINE.

THE city of Portland, Me., is plaintiff in a suit against the New England Telephone and Telegraph Company to recover $1,484 taxes assessed on the conduits of the company in the streets of the city.

The suit is brought under the provisions of Section 41 of Chapter 8 of the Revised Statutes of Maine, which, in substance, is as follows:

"The excise tax shall be in lieu of all taxes except real estate and personal property not hereinbefore exempted, which real estate shall be taxed in the municipality in which the same is situated, but the amount of tax assessed on such real estate shall be deducted by the Board of State Assessors from the tax laid under this chapter."

The company refuses to pay on the ground that the excise tax which it pays the State covers its liability for taxes except for land and buildings. It is the claim of the city that the conduits are real estate for taxation purposes.

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IN THE OPERATING FIELD

BELL STRONGHOLD INVADED BY INDEPENDENTS.

NINE to one the aldermen of Boston voted in favor of granting a franchise to the Metropolitan Home Telephone Company for an Independent telephone system. This action, it is said, was wholly unexpected by the Bell Company, and it is believed that officials at the headquarters of the company are in some consternation at the near approach of competition at their very doors. The matter of the franchise is now before the Mayor for approval.

Local capitalists who are interested in the movement assert that the money for building a plant is all ready to be subscribed, and that work on a plant will be started as soon as the franchise is approved.

GOVERNMENT OWNED TELEPHONES FOR MANITOBA.

THE proposal made by the Manitoba government to take over and control all the telephone systems within the confines of the province has met with general public favor. At first the telephone question was considered a party affair, but of late the opposition party appears to be as strongly in favor of it as the most ardent supporters of the government. Francis Dagger, the government's telephone expert, has been holding meetings all over the province for several months past and he reports that at each meeting the question becomes more popular and many of those who were bitterly opposed to the government ownership programme now admit that it would be a good thing. J. B. Ware, of Michigan, who has also done much to break the hold of the monopoly, is enthusiastic over the new conditions.

J. H. Ashdown, who has been elected mayor of Winnipeg for 1907, admitted such a course would be to the interests of the people, and his election is largely due to this admission. For years Mr. Ashdown has been a strong Liberal in politics, and bitterly opposed to Conservative tactics, but on the telephone question he has deserted his party. The Bell Telephone Company claims that it costs $160 per mile to construct telephone lines in Manitoba, but the following schedule of prices and expenses has been figured out by the Manitoba Department of Public Works:

Material and Labor, Length and Size of Cedar Poles.

	25 ft., 6-in. top.	25 ft., 5-in. top.	20 ft., 5-in. top.	20. ft., 4-in. top.
Poles, 32 to mile.....	$48.00	$32.00	$24.00	$19.20
Wire, 320 lbs.....	10.65	10.65	10.65	10.65
Glass and sideblocks...	3.00	1.60	1.60	1.60
Guying	3.00	3.00	3.00	3.00
Teaming poles	4.00	3.50	3.00	2.50
Setting poles	11.20	9.60	8.00	6.40
Stringing wire	4.00	4.00	4.00	4.00
Nails, etc.	.50	.50	.50	.50
	$82.95	$64.85	$54.75	$47.85

These are the prices at which the government is willing to contract with the municipalities to build their lines.

The campaign against the Bell Telephone Company has resulted in a large number of the municipalities deciding to hold a plebiscite on the question of government ownership and during the next few weeks some interesting figures in this connection will come to light. The results are indicated in the following report from our regular correspondent at Winnipeg:

The campaign against the Bell Telephone Company in Winnipeg, Manitoba, has borne fruit. At the civic elections held on December 11 a vote was taken on the question of installing a municipal or independent system. "Shall this municipality own and operate its own telephone?" was the question put to the electors, and they decided in favor of municipal ownership by a vote of 4,829 to 926 against. Only property owners were entitled to vote.

The result entitles the Council of 1907 to borrow money and establish a municipal system of telephones without further submitting by-laws authorizing the raising of this money to the ratepayers. The business men voted solidly for the by-law, the adverse vote being the result of a vigorous campaign put up by the Bell Telephone Company.

During the next few days a number of the provincial towns and rural municipalities will vote on the same question, and it is expected they will follow the example set by the Prairie capital.

A later report indicates that these smaller towns throughout the province have voted three to one to throw out the Bell system.

FIRST REGULAR MEETING OF THE INDEPENDENT TELEPHONE MANAGERS' ASSOCIATION OF MICHIGAN.

THE permanent organization was effected at Jackson last week of the association to be known as the "Independent Telephone Managers' Association of Michigan." The next meeting is to be held in six months, probably in Lansing.

The officers of the association are: President, F. V. Newman, assistant general manager Citizens' Telephone Company, Grand Rapids; vice-president, William J. Robinson, manager Citizens' Telephone Company, Muskegon; secretary-treasurer, H. T. Clough, manager Union Telephone Company, Owosso.

Any manager, wire chief, chief troubleman or head of any department of an Independent telephone company in Michigan is eligible to active membership, subject to the endorsement of his company and the approval of the Executive Committee. Presidents, general managers and others in the field of Independent telephony are eligible to associate membership. The annual dues are fixed at $2.

There were sixty present at the organization meeting, representing thirty-five companies. President Newman declares the membership will be increased to 200 before the next meeting, and all those at the initial meeting declare the organization will be productive of much good. The wide range of topics usually discussed at a meeting of telephone companies will be shunned; only practical questions of operation will be taken up, and these from personal experiences.

At this first meeting A. F. Burch, manager of the Citizens' Telephone Company of Battle Creek, gave an address on "Conduct and Personal Appearance of Employees," urging thoughtfulness, courtesy and neatness on the part of employees. He gathered material for his talk from papers which he requested three of his inspectors to write on the requisites of a successful inspector.

C. R. Kehoe, manager of the Citizens' Telephone Company of Jackson, spoke on "Switchboard Troubles" and pointed out the necessity for the education of inspectors by wire chiefs or managers so that they may be fully informed of the functions as well as the location of each portion of a telephone.

Other addresses were: "How Check Errors Can Be Reduced," by W. S. Vivian, manager of the Clearing House; "How to Improve Interchange Toll Business," by H. T. Clough, manager Union Telephone Company, Owosso; "Rural Lines," by C. R. Smith, manager Homer Telephone Company, Homer; "How to Encourage the Use of Your Long Distance Lines," by F. M. Howard, manager Valley Telephone Company, Flint; "The Good This Association May Do," by W. Robinson, manager Citizens' Telephone Company, Muskegon; "The Value of Discipline," by C. B. King, manager Washtenaw Home Telephone Company, Ann Arbor; "The Value of Independent Telephone Service for a Business Community," by F. V. Newman, manager Citizens' Telephone Company, Grand Rapids.

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QUERIES

KICK COIL TELEPHONES.—(803.)

We should like to learn, through your queries column, from anyone who has had experience with the so-called "kick-coil" telephone, as a substitute for the magneto instrument.

The editor will be glad to receive as full information as is available on this matter from managers of operating companies who have had experience. Full particulars as to instrument and kick coil, type of drop at switchboard, battery, actual working results, troubles, etc., etc., will be much appreciated. Such replies as are appropriate will be published.

PHANTOM WITH LAMP RESISTANCE.—(804.)

Will you kindly tell me if I can make a phantom out of two metallic circuits by connecting two 16 candle power 110 volt lamps across each end of each circuit, and taking off a tap from a point between the lamps, and connecting the taps to the switchboard? M. C.

A phantom circuit made in the manner you suggest will not give good results, for the reason that the talking and signaling current on both lines composing the phantom will be partially short circuited. To prevent this effect it is necessary to use a repeating or retardation coil. When these are used in a phantom circuit they present much retardation to voice currents passing over the single metallic pair, while they oppose little impedance to alternating currents transmitted on the phantom circuit.

This will be evident from a consideration of the effect of such a coil. For the sake of simplicity, take the familiar form of phantom made up with retardation coils instead of repeating coils. Draw a diagram showing a helical coil; join to each end a line representing a wire of a single metallic circuit. To the central point draw a line representing one side of a phantom. Now assume that current passes from the switchboard end of the phantom wire out to both sides of the metallic line, which in conjunction form one side of the phantom circuit. It will be evident that, looking at the end of the helix, a curved arrow indicating the direction of the current passing out over one half of the helix will have a direction corresponding to that of the rotation of the hands of a clock. The current in this half of the winding will consequently tend to produce a south magnetic pole at the end toward the observer. On the other hand, the direction of the current passing through the other half of the helix will be indicated by a curved arrow pointing in a direction opposite to that taken by the hands of a clock. The magnetic pole which this current will tend to produce at the end of the helix nearer to the observer will be opposite to that in the first instance. Consequently, if the two halves of the winding are perfectly balanced, one half will counterbalance the other, and the resulting magnetism produced in the whole coil will be zero.

The retardation depends on the variation in the strength of the magnetic field. As in this case there is no magnetic field created there can be no variation in its strength, hence no retardation, and current will be transmitted over the phantom without great loss. In a single line current passes continuously in the same direction along the helix, and consequently creates a magnetic field and the variation in strength sets up an opposing electro motive force due to self induction. The impedance of such a coil to current, which would tend to take this shunt path, is high as the full inductive effect of any variation is experienced in the winding which tends to form a shunt path directly across the line. In case you experiment with lamps in the manner mentioned by you, while you would probably get good transmission over your phantom, you would undoubtedly be considerably troubled by noise if either of the lines should be grounded, or run near an electric light circuit, tending to produce an unbalanced condition. Worse than this, you would spoil the transmission and ringing efficiency of the lines of which the phantom is to be made up. The only thing which is to prevent the passage of alternating current through the lamps is the non-inductive resistance of the lamps themselves, and this is wholly ineffective as a means of forcing current from the transmitter to take the comparatively long path over the line wires.

The effect of the lamps may be readily understood when it is considered that they shunt not only the actual resistance of the line, but the impedance of the receiving apparatus at the other end.

YARDSTICK TEST.—(805.)

What is meant by the "yardstick" test in cables and how can I locate a fault in one by this method? We have a ground in one of our cables and I have been advised to test for it by the above method. E. H. B.

The term "yardstick" test is sometimes applied to tests made with the slide wire form of the Wheatstone bridge or balance. This is a very simple method of making tests that is fairly correct and a very serviceable outfit may be rigged up at small cost in the following manner:

On some convenient board attach two binding posts B and C. Then, exactly sixty-two and one-half inches from B and C drive

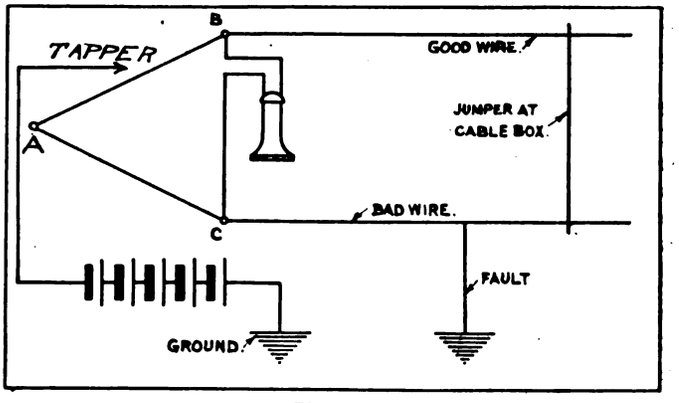

Fig. 805.

a peg "A." After this is in place stretch a German silver wire of small size, about No. 19 or No. 22, from B to A to C and attach a receiver to the binding posts B and C, thus completing the arrangement of apparatus. To make the test, take the pair of wires that is grounded and short circuit them at the cable box. The good wire of the pair should then be attached to B, the grounded wire to C. Then with the tapper feel along the wire A B until you reach a point at which you get no click in your receiver. This will be the neutral point or point of balance. Mark this point and measure its distance from A in eighths of an inch.

You will note that sixty-two and one-half inches equal 500 eighths, so you have 500 from A to B and 500 from A to C, making in all a total of 1,000. Therefore, one thousandth of this, or one eighth of an inch, will equal one one-thousandth of the circuit in your cable. If your cable is three thousand feet long your circuit would be twice that, or six thousand feet, and if one section on your slide wire equals one one-thousandth of your circuit, each eighth of an inch would therefore equal six feet. So if you find the neutral point of balance to be 120 eighths of an inch from A you would have $120 \times 6 = 720$ feet, the distance of the fault from the central office, or having

L = length of cable in feet,
S = spaces from A to neutral,
F = distance from cable box to fault,

then the formula would be $\frac{L \times 2}{1000} \times S = F.$

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TELEPHONE PATENTS

WIRELESS TELEPHONE TRANSMITTER.

Lee Forest, New York, N. Y., patents (No. 836,015; dated November 13th, 1906; filed December 11th, 1905; serial No. 291,222) a wireless telephone transmitter.

This patent covers broadly a method of transmitting speech by electro-magnetic ether waves, which consists in developing them into electrical oscillations having a spark frequency higher than the more essential frequencies accompanying speech, modifying these oscillations in accordance with speech waves, and converting the modified oscillations into electro-radiant energy. This principle is the one more definitely expressed in the patent No. 836,072, which covers the apparatus for accomplishing this result.

TELEPHONE SYSTEM.

F. G. Bell, London, England, patents (No. 831,819; dated September 25, 1906; filed October 9, 1905; serial No. 281,974) and assigns one-half to Isidore Bernard Birnbaum, London, England, a telephone system.

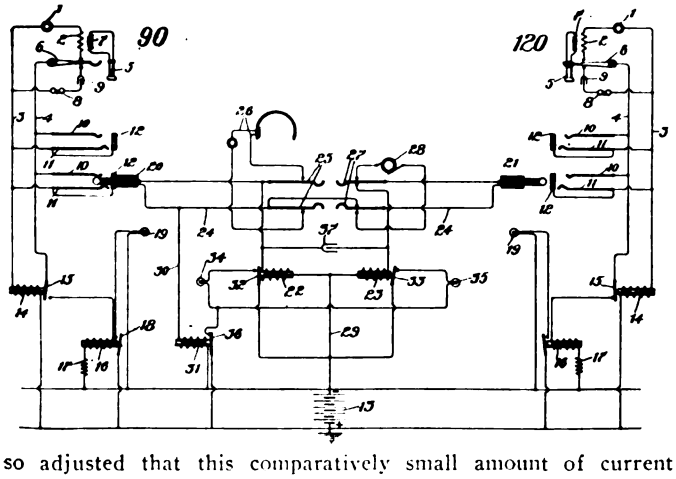
This patent describes circuits for common battery systems employing magnetic signals, by means of which the inventor claims that the line-indicator may be made simultaneously to serve as a clearing-out indicator and impedance coil, and possibly for other purposes. In addition to the central office line and connecting circuits, descriptions of a subscriber's set and operator's set of special types are given.

COMMON BATTERY TELEPHONE SYSTEM.

Alfred Stromberg, Chicago, Ill., patents (No. 835,046; dated November 6th, 1906; filed November 24th, 1902; serial No. 132,525) and assigns to the Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y., a common battery telephone system.

This patent covers an arrangement of circuits which will be evident from an examination of the accompanying diagram.

A line relay 16 is in series with the resistance 17, intended to bring the resistance between battery and line on this side to 2,500 ohms. When a subscriber takes his telephone off the hook the line relay is energized through this high resistance circuit, including 200 ohms in the cut-off relay. The cut-off relay 14 is

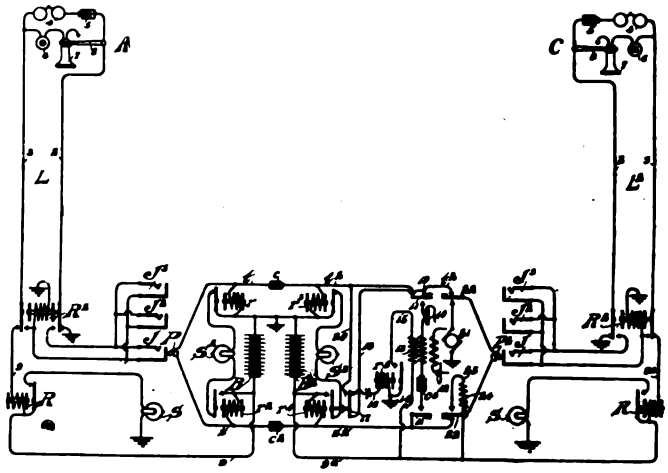


so adjusted that this comparatively small amount of current will not cause the attraction of its armature 15. The line relay is actuated because much more sensitive. When the operator plugs into the answering jack a circuit is established from battery through relay 14, sleeve spring 11 and relay 31 to negative battery. As this relay 31 is intended to have only about 500 ohms resistance, sufficient current will now flow through the cut-off relay to energize it. This cuts off the line relay. As the circuit through relay 31 is now closed, the positive pole of battery is connected with lamps 34 and 35. Relay 22 will be energized, and current flow from negative battery through tip strand of line 4, causing armature 32 to break the circuit through lamp 34. Lamp 35 will glow, owing to the current passing through unattracted armature 33. When the receiver is removed at station 120, coil of relay 23 will be energized, breaking circuit through lamp 35.

TESTING SYSTEM FOR TELEPHONE LINES.

William W. Dean, Chicago, Ill., patents (No. 836,489; dated November 20th, 1906; filed June 29th, 1903; serial No. 163,617) and assigns to the Kellogg Switchboard & Supply Company, Chicago, Ill., a testing system for telephone lines.

The operator's telephone circuit is adapted to be connected to



the line strands of the cord circuit by key springs 11 11. A tertiary circuit through winding 13 may be closed by the operation of a high impedance and high resistance test relay r^3. When the operator answers a call on line L she puts her talking set in connection with the cord strands, and, after finding out the number of the desired line, tests its jack J to ascertain whether or not it is busy. If it is busy the sleeve will be at a potential different from that of the ground, and current will flow through strand t^1, wire 18, relay r^5 and operate it. Connection from the forward part of t^2 to relay r^3 is broken at the listening key at this time. When the test relay is operated the circuit through the tertiary coil is closed, thus causing a click in the operator's receiver. Should the line be idle the relay will not be actuated, as the tip of the plug will be brought in contact with a jack maintained at ground potential. In this event the operator will insert plug P^2, and supervisory relay r^4, which, with r^3, controls the supervisory signal s^3, will be operated. This completes a circuit between conductors 18 and 20, disconnecting the test relay from the talking strand of the cord, and this condition will be maintained as long as plug P^2 is connected with the line. It will be evident that, after this condition has been established, the operator may connect her head telephone with the cord circuit without interrupting the path over the tip strand.

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Easophone, The New Hand Telephone

SINCE the organization of the Wire & Telephone Company of America, of Rome, N. Y., some eighteen months ago, much interest has been shown in the telephone field in the equipment made by this company. As the foundation of its manufacturing plant it purchased the copper wire mills of the Electric Wire Works and the Empire Wire Company and consolidated them in new buildings and also erected a separate building for the manufacture of telephone apparatus. It acquired the patents of Messrs. Houghton and Potter, which are looked upon by many of the best informed as being of exceptional value. While the instruments and apparatus made up under these patents have been in use for several years, it has been the policy of the Wire & Telephone Company of America to develop and perfect every detail and demonstrate their value in practical service before placing them upon the market.

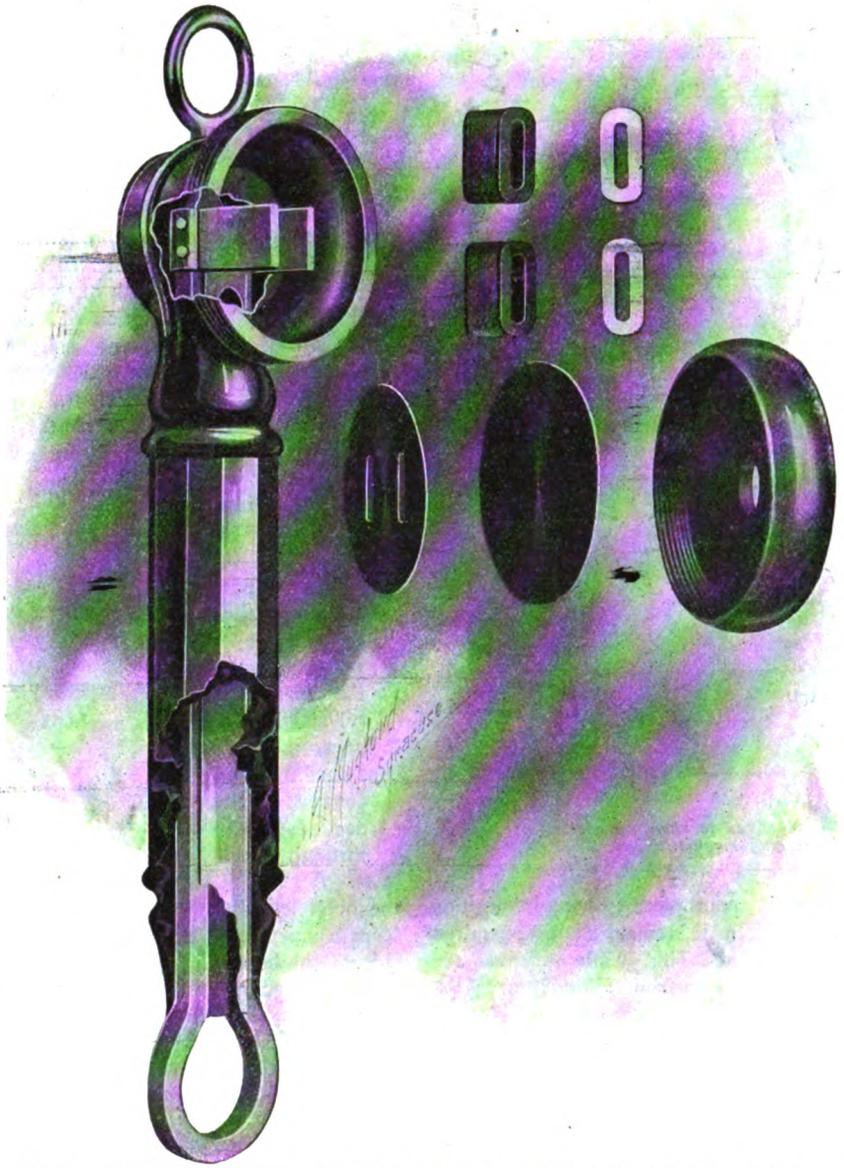

Fig. 1. Details of long magnet, moulded handle and receiver construction of Easophone.

The particular equipment shown in the illustrations which accompany this article is designated as Easophone equipment, No. 100, and in it are embodied many features which are regarded as radical improvements on the early types of hand telephone apparatus.

The Wire & Telephone Company of America emphasizes particularly the features of this instrument which make it equally well adapted to local or long distance service. The foundation of the structure is a long horseshoe type receiver magnet which forms the backbone, as it were, of the hand telephone. Over this is moulded and vulcanized in one piece the handle and receiver case. The transmitter, which is of the solid back type, generally approved for long distance work, is rigidly locked to the annular heel of the horseshoe magnet, affording a solid backing for the transmitter cup. This construction does away with the watch case type of receiver, and in addition to supplying the supplementary requirements of great rigidity and strength, provides a receiver of high efficiency.

The two electro-magnet cores for the receiver are firmly riveted to the horseshoe magnet, making it one solid part. As shown in the illustration, magnet coils are slipped over these pole pieces, and are firmly held in place by nickeled escutcheon plates, slotted to fit over the pole pieces above an interposed insulating disk of fibre. Between the arms of the permanent magnet extends a channel of sufficient dimensions to permit of the easy introduction and withdrawal of cords, which pass directly through the instrument to the connecting studs of the receiver.

In the transmitter a new method of assembling, invented by this company, has made it possible for a large number of screws heretofore used to be done away with. The rear case of the transmitter is provided on its forward portion with an outside screw thread which engages directly with the correspondingly threaded transmitter front plate. Sufficient length of thread is allowed on the front plate to receive, at its front portion, the threaded bridge ring which supports the electrodes, damping springs and binding posts. The bridge is a heavy metal ring having three arms projecting toward the center

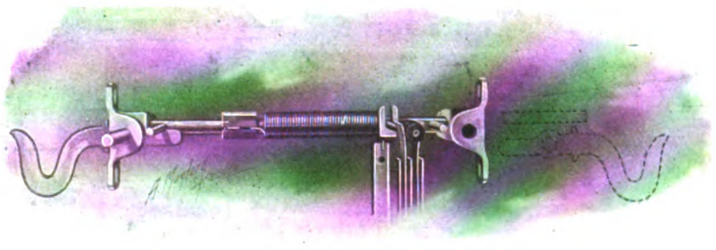

Fig. 2. The hook switch of Easophone. The hook may be inserted in the other side of case by removal of pin shown at left.

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and in the same plane. By means of a screw thread on the outside, it is screwed into the transmitter front plate instead of being fastened to this plate by machine screws. It forms a rigid and solid support for the rear electrode and the walls of the carbon chamber. The front electrode is fastened, is an integral part of the diaphragm, and therefore partakes freely of its vibration. Damping springs are screwed to one edge of the bridge ring with their tips resting on opposed sides of the diaphragm, parallel to each other, preventing vibration injurious to perfect transmission.

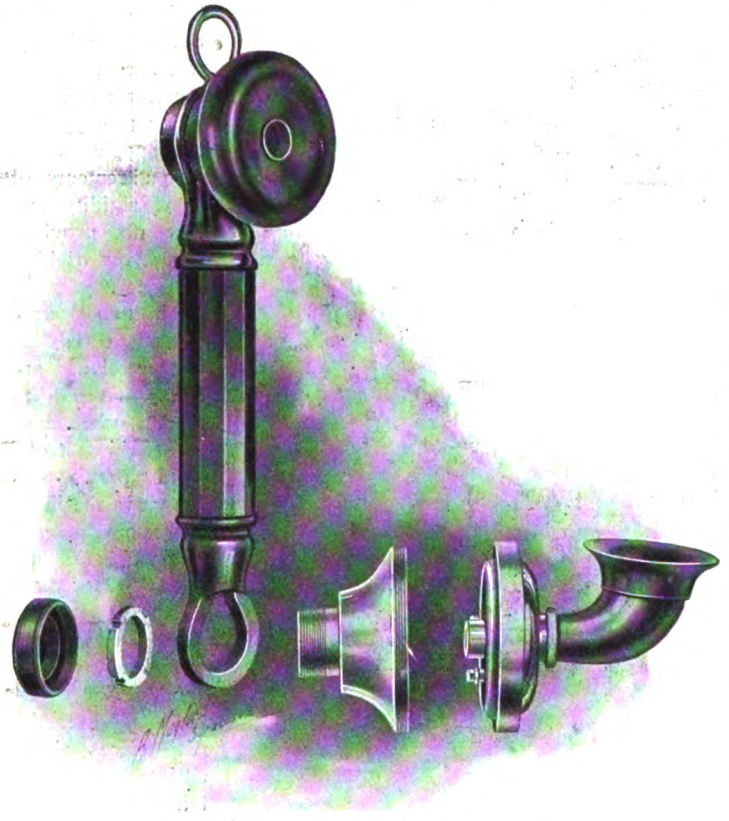

Fig. 3. Easophone transmitter, dissected to show the method of mounting in ring of magnet.

The hard rubber, horn shaped mouthpiece is held in position by a friction washer that causes it to remain in any required position to which it may be turned. This, while it leaves the mouthpiece free to revolve, prevents it from falling out of the case.

The bell box, exceptionally small and compact, is made of cold rolled steel, finished in black enamel. This box contains complete equipment, including ringer movement, hook switch, induction coil, condenser and cord terminal block. The ringer movement, which is patented by the Wire & Telephone Company of America, is of a new design, and has but one coil. This is wound on a split brass tube through which the vibrating armature extends. This armature requires no adjustment. The coil is protected, and its fiber block ends held in place, by the heavy permanent magnet which extends on either side of the coil. The armature is bent at right angles beyond the permanent magnet pole pieces. The tapper extends through a small slot in the box front and is protected from external injury by a brass cup.

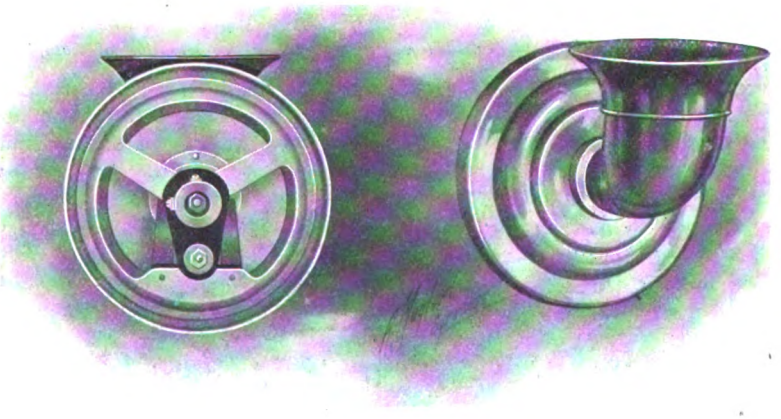

Fig. 4. An interior view of transmitter from the front; also front plate and horn.

Fig. 5. Detail view of Easophone hook switch.

Access to the bell box for adjustment of the bells is made unnecessary. By a new method, for which provision has been made, the gongs may be brought to the required position simply by the turning of two set screws, having their heads on the outside of the box, as illustrated.

Something similar to a listening key, the switch springs are mounted on hard rubber in two sets. These sets face each other and are adapted to be spread or come together, according to the position of a round rubber block. This block is pivoted above the gap between them on a pin projecting from a shaft running the width of the box and supported on bearing at the ends. The rotation of this shaft is controlled by the tension of a spiral piano steel wire spring, and the action of the hook lever, which engages a pin projecting from the circumference of the shaft. The tension of the spring may be changed by means of a slotted nut affixed to the shaft, the loose end of the spring being slipped in either of the four slots, according to the tension desired.

When the telephone is on the hook its weight opposes the tension of the spring Remove the telephone and the spring rotates the shaft until the rubber block is forced between the springs, spreading them so the desired circuit connections are made through their contacts. A rotating pin is placed at each end of the shaft, so that the hook lever may be used on either side of the bell box, the lever being pivoted by means of a pin fitting into holes on either side of the box.

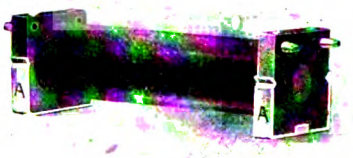

Fig. 6. Induction coil, showing notches engaged by fastening clips.

The induction coil is held in place by means of metal spring clips, as shown in illustration A. These clips are riveted to the bell box, a ridge provided on the inner side of the spring clips fitting corresponding grooves in each side of the fiber block ends of the coil.

The cord terminal block is of polished hard rubber, and is provided with Houghton Binding Posts. These posts are constructed on a new mechanical principle, obviating the creeping and cutting of the wire, and at the same time giving an exceptionally broad surface of contact. Into the lower portion of the binding posts are driven tubes which are

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You are instructed not to shout in a telephone, as you can hear better by talking in a natural, distinct voice.

The same rule applies to our perfect system of signals—they are clear and distinct to the operator and not confusing like lever blows of hammers.

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WANTED---Continued

POSITION WANTED—A practical telephone construction and equipment man, with twenty-five years' experience with one of the largest operating companies in the United States, desires position as assistant engineer or superintendent of equipment. The advertiser is holding a similar position at present, but wishes to enter the service of a company where he will have more extended opportunity. Thoroughly experienced in every branch of the business. Address Box 740, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 740

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WANTED—City Chief Operator; exchange 20,000 subscribers, as assistant to traffic manager. Reply, Box 744, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 744

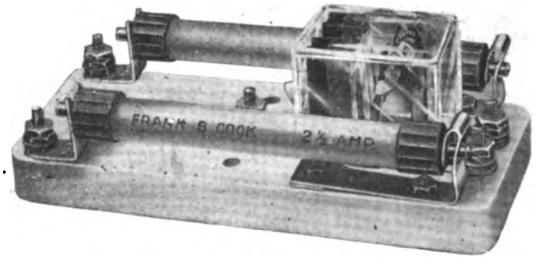
WANTED—An all round telephone man to do line and switchboard work and have charge of an exchange with 325 telephones. Address Otterbein Telephone Company, Otterbein, Ind. 745

WANTED—By Bell company operating just outside of New York City, two competent general foremen. Must understand heavy toll line construction and interior block work. Address Box 746, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 746

WANTED—Position as cable splicer. Good steady man, does all good work, good experience. Would like to get with good company. State terms. Address Box 747, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 747

PROTECTION IS CHEAP

Cheap at Any Cost--Always Cheaper than Buying Damage Suits, Fire Losses or New Telephones



Your telephones are not immune justbecause lightning storms are over for the season. Snow and sleet storms cause many crosses with high voltage lines. Such crosses cause bad fires and accidents. COOK'S TYPES B4-B5-B6 PROTECT YOUR TELEPHONES. ASK MORE ABOUT THEM.

Frank B. Cook. Mfr.

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inserted through holes in the hard rubber block and covering of the bell box for making connections, and incidentally serve the purpose of locking the binding posts firmly in position.

The condenser is put up in a sealed metal case, and forms the back of the bell box, being held rigidly in position on frame work A, in connection with springs B, as shown in the illustration.

From this description it will be seen that the design of the Easophone and its mechanical and electrical features are both novel and radical. The long horseshoe magnet gives great magnetic intensity at the pole pieces. Being also the base for the transmitter, it gives a very rigid construction, and thus the transmitter can truly be called "solid back." It is a well known fact that a transmitter held loosely in the hand will not give nearly as good transmission as when the transmitter is held to a solid wall or very solid backing. This is why the Wire and Telephone Company of America has made a heavy permanent magnet serve as a solid backing for the transmitter.

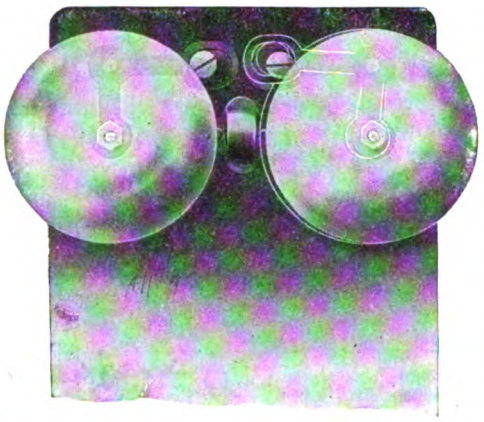

Fig. 9. Upper portion of front of case, showing gongs, adjustable screws and hammer guard.

Through the novel manufacturing features of the Easophone, its exposed parts have been reduced from about forty-nine in other types to nine. Being riveted to the magnet, the hook for hanging the instrument brings no strain on either the receiver or the transmitter.

The general conformation of the instrument and the method of mounting the receiver are such as to make it easy to obtain a firm grip on the instrument and adjust it to correct position for speaking. The receiver is so mounted as to fit easily against the ear of the user. A perfect balance is maintained in manufacturing this hand telephone, so that it is just as convenient for use as the ordinary bi-polar receiver, there being but little difference in the weight of the respective instruments.

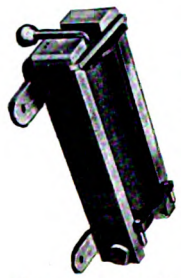

Fig. 7. Single coil ringer movement.

Among the other things which are expected to appeal strongly to the subscriber are the extreme flexibility of location. This is secured especially by the arrangement made for reversing the position of the hook switch. As, however, a hook switch mounted separately may be furnished it is not even necessary to have the bell near the user, and the greatest variety of locations on desk or wall is made available.

The design of the apparatus was perfected after giving due consideration to practical conditions of telephone operation. These were considered to include not only those features which would tend to make the instrument convenient to the telephone user, and attractive in appearance, but also the other features which would make it commendable from the maintenance point of view. Durability of structure is believed by the manufacturers to be secured to an exceptional degree through the use of the heavy magnet backbone, in addition to the other valuable features possessed by this radical departure from the usual practice. In covering this framework, and the exposed parts which should be shielded from exposure, the hard rubber is so moulded as to leave no projecting parts liable to be easily fractured should the instrument be accidentally allowed to fall. The reduction in the number of parts tends to increase by just so much the permanency of adjustment made in conformance with the factory standards.

An interesting feature is the so-called sweat-ring which encircles the opening in the receiver cap. Should the user perspire moisture will not readily pass to the interior of the instrument, and liability to corrosion and other troubles is minimized.

The novel switch hook mechanism is designed to have a positive action which will avoid trouble from a weakening or poor adjustment of springs. Should any adjustment be attempted the springs are so placed that they may be easily reached. The ringer movement, which can be adjusted from the outside, is a feature to which attention may be especially directed in this connection. The design, obviating as it does any necessity for changing the position of interior moving parts, leaves only the gongs to be moved. This can be accomplished by the mere turning of the screws projecting through the case, as the gongs are mounted on a rocker arm controlled by a cam movement ending in this screw, consequently the bells may be adjusted to give the best results by the mere turning of a screwdriver during a single long ring. The necessity for the repeated calling of the central office by the trouble man for the purpose of making tests is thus obviated.

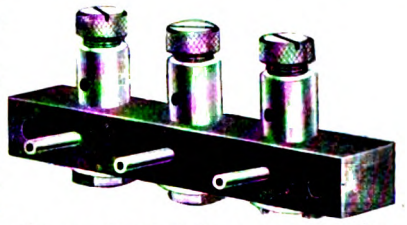

Fig. 10. Terminal block, with Houghton binding posts and connecting tubes.

Easophone has been in continuous use for a number of years, so that its practicability would seem to be thoroughly demonstrated. It is covered by a number of patents granted to Messrs. S. C. Houghton and F. M. Potter, Jr., and by them assigned to the Wire & Telephone Company of America. Messrs. Houghton and Potter have devoted years of study and experiment to this problem of improved apparatus.

The Wire & Telephone Company of America has an experienced engineering force competent to handled advanced telephone problems, and is well equipped for designing and installing systems in factories, office buildings, apartment houses, private residences, towns and cities. The company is fully prepared to take up this work in all its details, and believes that not only its telephones, but all other equipment which it uses in work of this class corresponds to the same standard as that set for the instrument described in this article. It has issued a very attractive Bulletin, designated as No. 101, in which this apparatus is described. This may be obtained by those desirous of obtaining further information by writing to the company at Rome, N. Y.

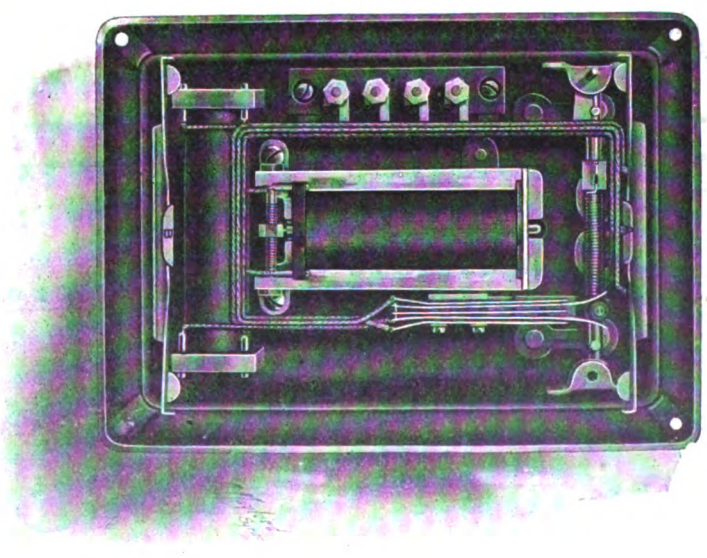

Fig. 8. Interior of Easophone, showing parts assembled.

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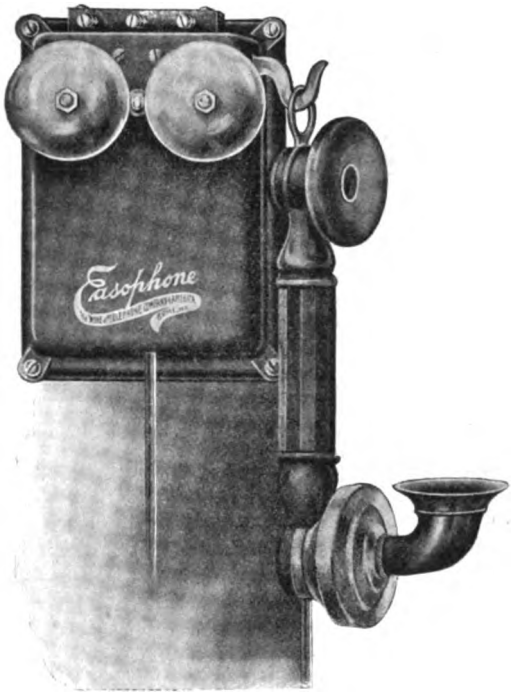

Easophones
The WIRE and TELEPHONE COMPANY of AMERICA
ROME, N.Y.

Long Distance Hand Telephone
Long Horseshoe Magnet Receiver

SOLID BACK TRANSMITTER
NO EXPOSED CONNECTIONS
SINGLE COIL RINGER
REVERSIBLE HOOK

EXPOSED BELL ADJUSTMENT
INDESTRUCTIBILITY

WRITE FOR BULLETIN No. 101

THE WIRE & TELEPHONE COMPANY OF AMERICA
ROME, N. Y.

CENTRAL

Talks With The Buyer—No. 3

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Do not take my word for it when I say our battery has a higher and better sustained voltage with a larger current output throughout a longer life than any battery that sells for 16⅔ cents each in barrel lots. The AJAX battery at 15 cents each in barrel lots is a 30 per cent. better battery proposition. AJAX batteries are made under special formula in one of the largest factories. Make your own tests at our expense. It costs us money to prove the truth of my statement in this way. We are willing to make the experiment, for your experience will be that of all our customers.

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THE WEEK'S MESSAGES

NEW COMPANIES.

POCAHONTAS, ARK.—A new Independent Telephone Company is being organized at Pocahontas. It is the intention of the organizers to construct lines in all parts of Randolph County.

GRANTFORK, ILL.—A rural telephone company, to be known as the Saline Rural Telephone Company, has been organized at Grantfork. The following officers and directors were elected: President, J. Schwarz; vice president, J. Reinhardt; secretary, H. J. Belim; treasurer, J. C. Schwarz; directors, Jos. Gruenenfeider, Hy. Schrumpf, Aug. Weder, John Leef, Aug. Datermann and J. Reinhardt.

LAKE VILLA, ILL.—The Farmers' Telephone Company has been organized, and will construct a line from about half a mile south of Monaville to Lake Villa, where an exchange will be established.

QUINCY, ILL.—The Northeast Quincy Telephone Company has been incorporated with a capital stock of $4,000.

CHECOTAH, I. T.—A new telephone company, known as the Canadian Telephone Company, has been organized at Checotah, and has elected the following officers: President, R. H. Berry, of Checotah; vice president, S. J. Logan, Brush Hill; treasurer, Dr. George McGuire, Checotah; manager, Golden Berry, Brush Hill; secretary, H. K. Shepard, Brush Hill. Lines are to be built at once between Checotah and Brush Hill, and later to many other points.

CRISFIELD, KAN.—The Crisfield Telephone Company has been organized and will construct a line between Crisfield and Attica.

KINGSLEY, MICH.—The Farmers' United Telephone Company has been organized at Kingsley.

METZ, MO.—An Independent Telephone Company has been formed at Metz, Mo. It is its intention to build lines all over the northwestern part of Vernon County.

ABIE, NEB.—An independent telephone company has been established at Abie, to be known as the Farmers' Telephone Company. It has an authorized capital stock of $1,500, and the incorporators are J. J. Shonka, J. J. Matous, F. J. Roh and Frank Marusak.

LEXINGTON, NEB.—Articles of incorporation have been filed by the Dawson County Mutual Telephone Company. The incorporators are R. Birth, Nick Kopf, D. Campbell, John A. Walford and A. J. Watkin. The company intends to operate a line between Lexington and Eddyville.

BEVERLY, OHIO.—The Beverly Telephone Company, of Beverly, has been incorporated by J. A. Hart and others. The capital stock of the company is placed at $5,000.

FINDLAY, OHIO.—An Independent telephone company, to be known as the Farmers' Mutual Telephone Company, is being organized by the farmers residing east of Findlay.

MANGUM, OKLA.—Articles of incorporation have been filed by the Independent Mountain Telephone Company of Mangum. It has a capital stock of $5,000, and among the incorporators are J. T. De Arman, J. R. Crook and J. R. Harris, of Willow, and W. W. Boyd and B. F. Waggoner, of Jester.

PECKHAM, OKLA.—The Air Line Mutual Telephone Company, of Peckham, has been incorporated with a capital stock of $225. The incorporators of the new company are Colonel Lockwood, C. H. Cunningham, James E. Howarth and H. P. Maus, of Newkirk, and Frank Coffeen, of Peckham.

BUTLER, PA.—The State Mutual Telephone Company has been organized, and will shortly be incorporated. It is the intention of the company to operate in Armstrong, Butler, Lawrence, Indiana, Westmoreland, Washington, Greene, Fayette, Somerset and Allegheny counties.

NEW BLOOMFIELD, PA.—Articles of incorporation are to be filed by the Perry County Telephone Company. The main exchange of the company is to be located at New Bloomfield, and lines are to be built to Blain, New Germantown, Ickesburg, via Centre and Kistler, Shermansdale, and possibly to Dellville and Grier's Point.

STRAWBERRY RIDGE, PA.—At a meeting of the delegates of the People's Telephone system, it was decided to incorporate the system under the title of the People's Telephone System No. 1 of Pennsylania.

BONESTEEL, S. D.—A new independent telephone company, to be known as the Rosebud Telephone Company, has filed articles of incorporation. It is capitalized at $25,000, and the incorporators are H. F. Slaughter, of Gregory, and G. N. Van Avery and Lucius Leslie, of Napier, Neb. The company expects to build lines into every part of Gregory County.

WASHTUCNA, WASH.—The Washtucna High Line Telephone Company has been organized, with E. H. Wyrick as president and Otis Leonard as secretary.

CHARLESTON, W. VA.—An Independent Telephone Company has been incorporated, with a capital stock of $6,000, to operate in Mineral, Hampshire, Grant and Hardy Counties. The incorporators are G. B. Shank, Burlington; A. A. Welton, Williamsport; G. P. Miller, Romney; C. D. Bowman, Moorefield; F. L. Baker, Burlington; L. J. Forman, Petersburg.

SHERIDAN, WYO.—An Independent telephone company is being organized at Sheridan, with the intention of building lines connecting this city with Dietz, Carneyville, Monarch, Ranchester, Dayton, Cloverly, Shell, Coburn, Crystal, Kane, Iona and Lovell. It is understood that Ira Waters, who is manager of the Lovel Telephone systetm, is interested in the new company.

FRANCHISES.

PINE BLUFF, ARK.—The Telegraphone Company of Arkansas has been granted the right of way over the Iron Mountain Railway for its poles and wires, incident to the proposed long distance service to be inaugurated by the independent companies. The Telegraphone Company represents a merger of the Independents solely for accomplishing long distance service.

BERKELEY, CAL.—It is quite probable that a forty-year franchise will be granted to the Home Telephone Company at Berkeley.

WHEATLAND, CAL.—An application is before the Board of Trustees of Wheatland for a telephone franchise for lines to run across the Horst, Drescher and Durst lands into Wheatland. The application is made on behalf of the dredger operators on the Bear River.

HUNTINGTON, IND.—The New Long Distance Telephone Company, which is building a telephone line from Wabash eastward, has been granted a franchise at Huntington, at which place a toll station will be established.

WASHINGTON, KAN.—The Washington Mutual Telephone Company has applied for a franchise at Washington.

GRETNA, NEB.—The Farmers' Telephone Company has been granted a franchise at Gretna.

ASBURY PARK, N. J.—The township committee has granted the city the right to erect and maintain a private telephone line to the Municipal Hospital.

HACKETTSTOWN, N. J.—The Hackettstown Telephone Company has applied to the Morris County Board of Freeholders for permission to erect its lines over Schooley's Mountain between Hackettstown and German Valley. It is the company's intention, if successful, to connect the Independent system of Sussex County with the Independent lines of Hunterdon County and the Chester Company, of Morris County.

BAKER CITY, ORE.—Indications point to the establishment of an independent telephone system at Baker City, to compete with the Bell Company. A twenty year franchise has been applied for by R. C. Robertson, a Portland capitalist, and his associates, and it is their intention to build lines throughout Baker County, and establish an exchange at Baker City.

EAST GREENWICH, R. I.—Application for a franchise at East Greenwich has been made by the Home Telephone Company, of Providence.

HERMOSA, S. D.—The Hermosa Telephone Company has been granted the right of way through Rapid City.

FINANCIAL.

WHEELING, W. VA.—The board of directors of the National Telephone Company, at a recent meeting, declared a stock dividend of twenty

NEWS—WANTED

THE matter contained upon the message and Operating Field pages of this paper is contributed largely by our special correspondents. We believe, however, that there are many valuable items of telephonic interest which are never brought to the attention of the public. There is no reason why this condition should exist, and the Editor, therefore, invites all telephone companies and the officials of such companies, to furnish any information that they can consistently make public relative to financial statistics, new construction, elections, franchises and personal items.

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THE VALUE OF A MEASURING INSTRUMENT

Suppose you have a line in trouble—grounded or open. You don't know the exact location, but you send out a troubleman to hunt it up and clear it. It may take him an hour or a day. Meanwhile the subscriber is getting hot under the collar and saying things about telephones in general and yours in particular.

If you have a Pignolet voltmeter or volt-ammeter you can determine the approximate location and also get an idea of the nature of the trouble. With the information your troubleman can find the fault in jig time, and you will have prevented the subscriber kicking by giving him service at the earliest possible moment.

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Form G-90-F.	For Small Exchanges, Tolls only.
Form G-90-G.	One subscriber to a sheet; carries account 4 years.
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Form G-90-I.	For Small Exchanges; Bound Books; carry 12 subscribers on a page for 1 year.

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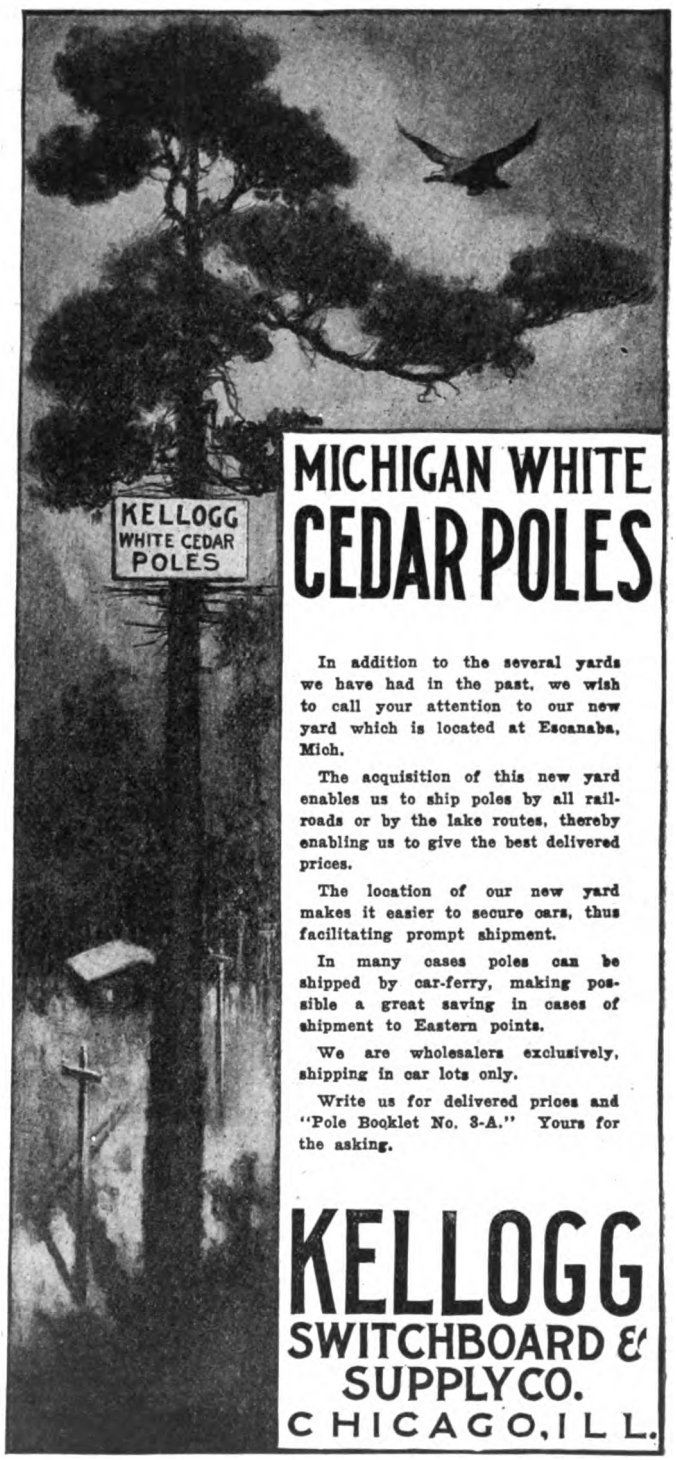

MICHIGAN WHITE CEDAR POLES

In addition to the several yards we have had in the past, we wish to call your attention to our new yard which is located at Escanaba, Mich.

The acquisition of this new yard enables us to ship poles by all railroads or by the lake routes, thereby enabling us to give the best delivered prices.

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CHICAGO, ILL.

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THE WEEK'S MESSAGES

per cent, payable at once. The board also fixed March 15 and August 15 as the semi-annual dividend periods, and on and after these dates cash dividends of three per cent will be paid. The company is planning the expenditure of large sums for betterments and improvements.

COMBINATIONS.

HARMON, ILL.—The telephone system at Harmon, formerly owned by Mr. Purcell, has become the property of the Green River Telephone Company. An agreement has also been entered into with the Home Telephone Company, of Dixon, by means of which the Green River Company will gain control by lease of the line to Dixon. A great many extensions and improvements in the system are to be commenced at once.

CARBONDALE, PA.—The Consolidated Telephone Company has closed a lease with the Anthracite Telephone Company, of Forest City, and a traffic agreement with the Rochester Telephone Company. This will enable the Keystone and other Independent lines in Philadelphia and Eastern Pennsylvania to talk to Buffalo and all points in Western New York State.

ELECTIONS.

BESSEMER, ALA.—The North Johns Telephone Company has elected the following officers and directors: President, A. L. Thompson; secretary and treasurer, Columbus Blankenship; directors, Felix Parsons, W. P. Clapp and Monroe Goodwin.

FORT WAYNE, IND.—The following officers have been elected by the Nine Mile Telephone Company: President, Frank P. Harber; secretary and general manager, R. H. Minnick; treasurer, Alex Cunnison.

LA GRANGE, IND.—The Northern Indiana and Southern Michigan Telephone Company has elected the following directors: A. J. Hostetler, C. B. Sears, M. L. Johnston, A. H. Ellison and H. H. Smith.

JACKSON, MICH.—The following officers have been named by the Telephone Managers' Association of Michigan: President, F. V. Newman, of Grand Rapids; vice president, William Robinson, Muskegon; secretary and treasurer, H. T. Clough, of Owosso.

LEWIS, KAN.—The following officers and directors have been elected by the Edwards County Mutual Telephone Company: D. D. Thompson, president; E. T. Fox, vice president; E. M. Johnson, secretary; C. E. Sturdevant, treasurer. Directors: E. M. Johnson, A. Gatterman, Mr. Lesley, D. White, F. Hardy, T. Weese, H. Fell, J. W. Bridges.

PERSONAL.

KENDALL WEISIGER, who has recently been in charge of special traffic work in the office of the general manager of the Southern Bell Telephone and Telegraph Company at Atlanta, Ga., has again become connected with the engineering department of the company, with which he was formerly associated. His new position is that of assistant to Chief Engineer George J. Yundt, and marks a further step in the rapid advance he has made.

MISCELLANEOUS.

OSCEOLA, ARK.—The Tri-State Telephone Company, of Osceola, has filed articles showing that its name has been changed to the Tri-State Telephone and Telegraph Company, and the capital stock has been increased to $120,000.

PALMYRA, ILL.—The telephone system at America City, which is about eight miles from Emporia, has been acquired by Robert Whitlock, of Palmyra.

LIVINGSTON, MICH.—The Livingston County Mutual Telephone Company has contracted with the Locke Mutual Telephone Company for a free interchange of service over a trunk line, to be constructed at once, between Fowlerville and Bell Oak.

CALIFORNIA, PA.—The Union Telephone Company, of California, has formed connections with the Tri-State lines, at Brownsville, which will enable it to give long distance service to many parts of the country.

HAYWARD, WIS.—The Spooner Telephone Exchange, owned by W. J. Whistler, of Hayward, has been acquired by G. H. Ross, of Chetek. Improvements will be made in the system.

New Construction in the Field

FULTON, ILL.—The Fulton Mutual Telephone Company is building a number of new lines. One is to be run through Ustick, where connections will be made with the Whiteside Mutual lines.

THEBES, ILL.—The Thebes & Cairo Telephone Company has commenced work on its system.

SULLIVAN, ILL.—The Sullivan Telephone Company is making arrangements for better service between Sullivan and Decatur.

HARTSVILLE, IND.—A new switchboard has been installed by the Citizens' Telephone Company, and other improvements will be made in its system.

GRADY, I. T.—The lines of the Hendricks Telephone Company are being extended into Texas.

CEDAR, IOWA.—It is the intention of the Cedar Lake Telephone Company to install a new switchboard at Cedar.

COUNCIL BLUFFS, IOWA.—The Independent Telephone Company is making arrangements to accommodate one thousand more telephones on its switchboard.

LAMOTTE, IOWA.—The Bernard-Zwingle line expects to build a line from Lamotte to meet one which is now being constructed by Dr. Abler.

OTTUMWA, IOWA.—The Ottumwa Telephone Company is constructing a line between Centerville and Ottumwa.

POMEROY, IA.—The Mutual Telephone Company, of Rockwell City, expects to make many improvements in its system at Pomeroy.

IONIA, KAN.—The lines of the Star Telephone Company are being extended in Ionia.

LEONA, KAN.—Many improvements are being made in the system of the Leona Farmers' Mutual Telephone Company.

SOLON, ME.—The Farmers' Telephone Company is building a line to South Solon.

BEAR LAKE, MICH.—It is the intention of the Benzie County Telephone Company to install a new switchboard.

LUDINGTON, MICH.—The Lake Shore Telephone Company, of Ludington, contemplates the erection of lines to Fountain and Manistee.

JONESVILLE, MICH.—New lines are being built at Jonesville by the Himebaugh Telephone Company.

REED CITY, MICH.—The Citizens Telephone Company, of Grand Rapids, is to erect a new exchange at Reed City. The company also has under construction lines between Traverse City and Elk Rapids, and Traverse City and Kalkaska.

SILVER CREEK, MICH.—The Morton Telephone Company is extending its lines in Silver Creek.

DULUTH, MINN.—The Zenith Telephone Company contemplates making extensive improvements in its system at Duluth at an early date, and expects to have a strictly up-to-date plant at this place.

DONIPHAN, MO.—The Farmers Mutual Telephone Company has commenced the construction of its system at Doniphan.

ELGIN, NEB.—The Northern Antelope Telephone Company expects to make improvements in its system.

WEST CHESTERFIELD, N. H.—Poles are being set through West Chesterfield, from Brattleboro, by the Farmers' Telephone Company. It is its intention to continue the line on into Westmoreland.

STATESVILLE, N. C.—The lines of the Iredell Telephone Company are being extended in Statesville.

FARGO, N. D.—A trunk line from Fargo to Glendive, Mont., connecting with Valley City, Jamestown, Bismarck, Mandan, Dickinson and other intermediate points, is being constructed by the North Dakota Independent Telephone Company.

DELPHOS, OHIO.—The Delphos Home Telephone Company has formed connections with Marion Township, Allen County, and Washington Township, Van Wert County.

SUGAR CREEK, OHIO.—The Berlin Telephone Company, of Sugar Creek, is erecting a line between Shanesville and Barrs Mills. It is also the intention of the company to build a line through to Strasburg.

BLOOMSBURG, PA.—The People's Telephone Company, which has an exchange at Strawberry Ridge, and which operates in Montour, Northumberland and Lycoming Counties, proposes to extend its lines to Bloomsburg.

LEAD, S. D.—The Homestake Mining Telephone Company is to establish a telephone system connecting with the towns of Piedmont, Nemo, Hanna and Nahant. The lines will be for the exclusive use of the company, and the switchboard will have a capacity of about 100 telephones.

UNDERGROUND.

CHAMPAIGN, ILL.—The Home Telephone Company is placing some of its wires underground in Champaign.

PEORIA, ILL.—The city officials of Peoria have decided that all wires must be placed underground in the business section of the city.

SIOUX CITY, IOWA.—An ordinance has been introduced at Sioux City making it necessary that all wires in the business section of the city be placed in conduits.

COLUMBUS, OHIO.—The Citizens' Telephone Company is to place some of its wires underground in Columbus.

MASON CITY, IA.—The Western Electric Telephone Company expects to re-lay all of its cables in Mason City, Iowa.

FITCHBURG, MASS.—The Worcester County Home Telephone Company, of Worcester, has applied for permission to place its wires underground in Fitchburg.

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A Novel Transmitter

By Dr. Alfred Gradenwitz.

THE working of a telephone transmitter is known to be due to the sound vibrations in the membrane resulting in variations of the pressure exerted by the latter on a movable contact. These alterations in pressure in turn produce alterations in the electrical resistance of the circuit and accordingly an increase or decrease in the intensity of the current traversing the transmitter. To these alterations in current intensity will correspond an induced current which in the receiver reproduces the words spoken into the transmitter. It has been inferred that by multiplying the contact it should be possible to produce a more intense effect; in fact practically all the transmitters at present in use are of the multiple-contact type. The contacts are generally arranged behind the membrane so that only the increase and decrease of the pressures towards this side is utilized, while the membrane oscillating backward after each deflection is bound to act also on a contact fitted to the front of the membrane, in an inverse direction.

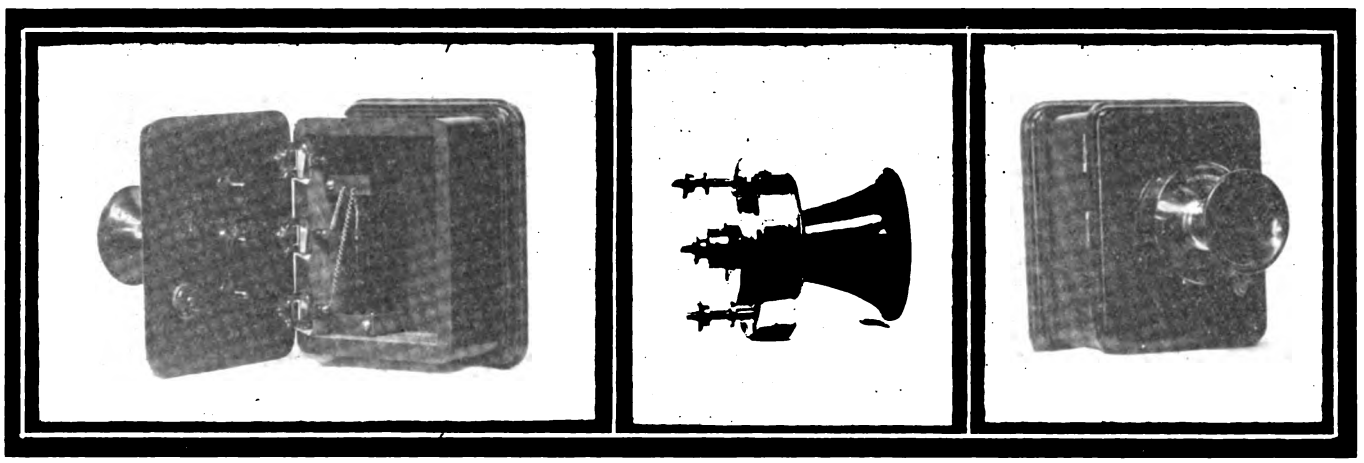
Endeavors have been repeatedly made to utilize this fact by producing double-effect transmitters, a utilization of the vibrations of the membrane to both sides being obviously advantageous. Though several patents on such instruments have been delivered, none has been adopted in European practice, all of them being doubtless affected by the drawback that the alterations in resistance for the vibrations on either side are never equal, resulting in a defective reproduction.

The Zürcher Telephon-Gesellschaft, Zurich, Switzerland, has recently constructed a novel type of transmitter in which this result is obtained, and which is believed in many quarters to be an excellent piece of apparatus for use and especially satisfactory on long-distance telephone lines. While for local conversations an ordinary apparatus will generally be sufficient, the requirements of the relatively short lines being not so high, an advantage is even then expected to be derived from the use of the novel apparatus, which proves most useful in connection with interurban lines in which the high resistance and other disturbing factors make the maximum efficiency of transmission a practical necessity.

The construction of the apparatus is as follows, reference being made to the lettered drawings which appear upon the following page:

The membrane *a* is, by the action of springs *b*, pressed against a projecting part of the metal box *c*, being kept there in such a way as to be free to oscillate. In front of the membrane, towards the sound opening, has been attached to the extreme edge of the metal box, a metal plate *g* carrying on the inside (turned towards the membrane) a ring *d*, preferably of carbon, with small hollows on the side turned towards the membrane. These hollows are filled with small carbon balls. In front of the inside of the membrane is fixed a carbon disc *e*, having similar holes, and these holes are filled up with similar carbon granules.

If the apparatus be so arranged that the membrane is in a vertical position, the carbon balls on both sides of the membrane will readily apply themselves against the latter, thus ensuring the electrical contact as in other granular carbon transmitters. The several parts of the apparatus are so connected with each other that the current in the battery, after getting to the diaphragm, will be there subdivided, one branch going through the carbon balls in front of the diaphragm to the carbon ring, and the other through the carbon balls behind the diaphragm to the carbon disc. The induction coil includes two primary windings, either of which forms a branch circuit. The windings of both coils surround the core of the induction coil in the same direction; as, however, they are connected to opposite poles of the battery, their inductive effects will be opposed to each other. By the use of a ring the sound waves are allowed freely to strike the middle of the diaphragm, the vibrations (which spread in concentrical circles), being bound to strike all the contacts on one side of the diaphragm in a given direction and with a given intensity, while the effect on the contacts of one side of the membrane is opposed to the effect on those situated on the other side. To an increase in pressure and accordingly a decrease in resistance on one side will thus correspond a decrease in pressure and increase in resistance on the other side, and vice versa. The resulting alterations in current intensity must necessarily be as



External Views of a Novel Transmitter Recently Brought Out in Europe.

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great in the contacts in front of the membrane as in the contacts behind the latter, as the membrane, after a deflection to one side, will swing back the same amount in order to attain its zero position.

As the two primary coils, according to the above, exert opposite inductive effects, while being connected to opposite poles of the battery, their inductive effects on the secondary coil will add themselves. By fitting a disc of varnished silk or some similar material, the moisture produced in speaking is prevented from arriving at the contacts, which would soon disable the apparatus.

A construction equivalent in principle would consist in fixing the diaphragm in the centre instead of at the edge by the springs *b*.

The advantages of this instrument are believed to be expressed by a simple calculation, the results of which are borne out by experiment:

Let J be the current intensity in the undivided circuit and J_1 and J_2 the current intensities in the two branch circuits respectively, r = 2.5 ohms, being the resistance in the divided circuit, r_1 = 5 ohms the resistance of one branch, r_2 = 5 ohms that of the other (both r, r_1 and r_2 including the battery, the corresponding contacts and corresponding primary coil) and E, the electro motive force of the battery, = 3 volts.

There will then be in the state of rest:

$$J = \frac{E}{r + \frac{r_1 \times r_2}{r_1 + r_2}} = \frac{3}{2.5 + \frac{5 \times 5}{5 + 5}} = 0.6 \text{ amp.};$$

$J_1 = 0.3$ amp.; $J_2 = 0.3$ amp.

If the resistance of the contacts in front of the membrane decreases 2 ohms during the conversation, that in the contacts behind the membrane will increase by 2 ohms. Then r_1 becomes = 3 ohms, and $r_2 = 7$ ohms, and

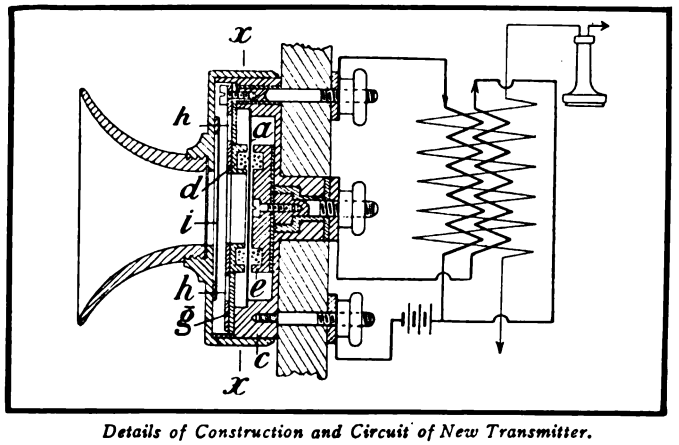
$$J_1 = \frac{3 \times 7}{(2.5 \times 3) + (2.5 \times 7) + (3 \times 7)} = \frac{21}{46} = 0.4565 \text{ amp.}$$

This as compared to the state of rest will given an increase in current intensity amounting to 0.1565 amp.

Inversely J_2 becomes

$$J_2 = \frac{3 \times 3}{(2.5 \times 3) + (2.5 \times 7) + (3 \times 7)} = 0.1956 \text{ amp.}$$

being thus decreased by 0.1044 amp.



Details of Construction and Circuit of New Transmitter.

The sum of the inductive actions in the two coils thus becomes 0.2609 amp.

This effect will be found the same whether the effect of the oscillation in front or at the back of the membrane be considered.

In the case of a microphone having contacts only on one side of the membrane, everything else being the same (E = 3, r = 5 + 2.5) the following figures will be found:

The current intensity at the state of rest will be $\frac{3}{7.5} = 0.4$ amp.

When increasing the resistant by 2 ohms, the current intensity becomes 3:9.5 = .3158 amp.

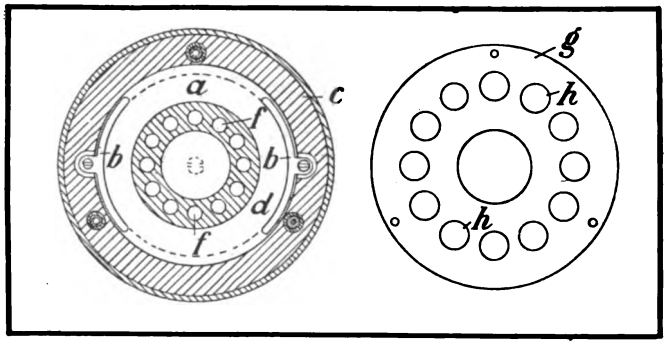
and when reducing it by 2 ohms it becomes 3:5.5 = .5454 amp.

In this first case the decrease as against the current intensity at the state of rest will be .0842 amp.

and in the second case, the increase .1454 amp.

The induction effect of this transmitter, which has been shown to be .2609 amp., is thus more than three times the inductive effect of an ordinary transmitter, comparing the current intensity due to the increase in pressure, while being nearly twice that effect, when considering the increase in pressure and resulting increase in current intensity. In both cases a considerable reinforcement of the effect will be thus obtained.

Calculation however seems to reveal another advantage of the



Plan Views of Portions of Transmitter.

new apparatus, which is possibly still more important. As the induced current in the telephones reproduces the words spoken into the trnnsmitter, the reproduction should become the more distinct and the clearer as the alterations in current intensity in the primary coil correspond more exactly to the oscillation of the transmitter diaphragm, that is to say, as they are more exactly proportional to the changes in position of the latter. As a matter of fact the alteration in current intensity in the case of ordinary transmitters show rather considerable departures from proportionality. As shown by the above calculation, the increase in current intensity produced by a decrease in resistance by 2 ohms, will be nearly twice the decrease (0.1450:0.0842) corresponding to the equivalent increase in resistance. The ratio is more exactly = 1722:1000.

In the new apparatus the inductive alteration will, however, be always the same, giving a ratio of 1000:1000.

When comparing the effect due to different alterations in resistance, the following result will be obtained:

An increase of .1 ohm in the resistance of one branch circuit of the new transmitter, and accordingly an equivalent decrease in the other circuit will give rise in the former to a current intensity of

$$J_1 = \frac{3 \times 4.9}{(2.5 \times 4.9) + (2.5 \times 5.1) + (4.9 \times 5.1)} = 0.294058 \text{ amp.}$$

that is, a decrease as against the current of 3 amp., corresponding to the state of rest, of .005942 amp.

In the other branch circuit the current intensity J_2 becomes

$$J_2 = \frac{3 \times 5.1}{(2.5 \times 4.9) + (2.5 \times 5.1) + (4.9 \times 5.1)} = 0.306061 \text{ amp.}$$

giving a surplus as against the state of rest of .006061 amp.

An aggregate induction effect corresponding to a difference in current intensity of .012003 amp. will thus be obtained.

The alteration of the inductive current intensity, corresponding to a decrease or increase of 2 ohms in the resistance, would thus be in the case of an accurate proportionality.

20 × 0.012003 = .24006 amp.

In reality it, however, as mentioned, amounts to .2609 amp.

This will correspond to a ratio of 1000:1087, which is a very small departure from proportionality.

In the ordinary transmitter an increase of .1 ohm in the re-

(*Continued on page 423.*)

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The Telephone Campaign in Manitoba

By J. B. Ware.

THE telephone investigation by the Dominion of Canada in 1905, under Sir Wm. Mulock, Postmaster General, suddenly ended with his unexpected transfer to a judgeship, and the putting at the head of the department of the Hon. A. B. Aylesworth. The latter gentleman was the Bell Telephone attorney, who, more than any other man, had placed difficulties in the path of the investigating committee of the Dominion Parliament. Only through the action of the provinces could their citizens secure the benefits sought by Sir William Mulock, these being the municipal ownership of telephone exchanges and the government ownership of the long distance lines.

In Manitoba the Union of Municipalities is a non-partisan organization, composed of the Mayors, or Reeves, and Councilmen of the cities, towns, villages and rural municipalities, each being organized and governed on almost identical lines. This union was formed in the Fall of 1905. After careful consideration, by a unanimous vote, it requested the Provincial Government to investigate telephone conditions and take such steps as would secure to the citizens of Manitoba the public ownership of telephones.

J. B. Ware.

A commission was appointed with the Attorney General of the province, the Hon. Colin H. Campbell, as chairman, and a very thorough investigation was made and a comprehensive report submitted to the Legislature.

In conjunction with a committee of the Municipal Union, the Legislature prepared and passed, by unanimous vote, the present famous telephone acts, "Chapters 89 and 90." These acts make broad provision for the Provincial Government to build, buy, lease and own telephone lines and property; to lease and operate exchanges in the cities of Winnipeg, Brandon and Portage La Prairie (the three important cities of Manitoba with populations of 100,000, 12,000 and 6,000 respectively) if requested by their councils so to do. They also provide for Governmental supervision of telephones, so that no expenditure by a municipality can be made until plans showing desired construction, subscribers' rates and other information are submitted to the Board of three Commissioners and approved by the Government. With such approval, the Government is to guarantee the municipality's telephone bonds, bearing 4 per cent. interest, to an amount sufficient to construct the exchange.

The Provincial Government may, from time to time as required, issue the bonds of the province to obtain the funds necessary to construct long distance lines throughout Manitoba, and the exchanges in cities before named. Thus the credit of Manitoba is back of both long distance and exchange telephone interests, insuring ample funds for construction as required, and greatly simplifying the problem.

To obtain a ratification of the government's plan by the people of the province, and at the same time pass, in each municipality, a money by-law authorizing the issuing of telephone bonds by a 60 per cent. vote of all rate payers assessed $400 or over, and voting, it was provided that at the next election a vote should be taken accordingly. This election was held in Winnipeg December 11th, and in the rest of the province on December 18th.

In order to have a non-partisan campaign of education upon the advantages of public ownership of telephones, it was placed in charge of the Provincial Telephone Expert, Mr. Francis Dagger, who is well known to the telephone world. Mr. Dagger arranged with several prominent men to actively assist him in the campaign.

Ex-Mayor Dyke, of Fort William, Ontario, was mayor when that city and Port Arthur established municipal ownership of telephones, which, with the water, light and street car utilities, have been and are now so successfully operated by these cities. This success has been attributed in large measure to his efforts. Mr. Dyke was the most polished speaker in the campaign, on either side. He has had over twenty-five years' experience upon the platform, and is possessed of a wide acquaintance throughout Manitoba. Mr. Dagger was very fortunate in securing Ex-Mayor Dyke through the entire campaign as he made more addresses than any other speaker, and did very effective work.

Mr. N. F. Wing, of Grass Lake, Mich., was engaged for the last month of the campaign in the rural and village municipalities. Mr. Wing, a successful Michigan farmer, who has during the past seven years built up a fine system of over 500 rural telephones in Jackson county, proved an effective speaker. He addressed some forty meetings, some of them held in school houses which he was able to reach only after making long drives.

Dr. J. F. Demars, of Levis, Province of Quebec, was enlisted in the Government's behalf to do service among the French settlements. He spent two weeks and addressed nearly twenty meetings in the French language.

Mr. Al. Hoover, Toronto, president of the Canadian Independent Telephone Association, spent nearly three weeks in active campaign work in the southern portion of the province and proved a strong man for the Government's cause.

Mr. C. B. Cheadle, attorney-at-law from Joliet, Ill., secretary of the Illinois Independent Telephone Association, did active campaigning for about two weeks, addressing ten meetings.

Mr. J. H. Shoemaker, of Waterloo, Ia., gave a week of active and very effective campaign work. Mr. Dagger, in addition to the supervision of the campaign, and other very important and burdensome office work, was able to make a number of public addresses in various places in the province. The writer of this article was actively engaged in the entire campaign.

The most important gathering was the annual meeting of the Union of Municipalities held on November 6, 7, and 8, at Portage la Prairie. The Government paid the expenses of two delegates from each municipality, and some 200 or more were in attendance. On Wednesday, November 7, articles bearing on the telephone situation were read by Mr. Dagger, Mr. Dyke, Mr. Ware and Mr. Cheadle, while E. H. Moulton, president of the Twin City Telephone Co. of Minneapolis and St. Paul, Minn., made a very interesting address to the convention.* The next day, after a lengthy discussion, the convention endorsed the Government telephone legislation by a vote of 89 to 16, and recommended that the people vote for it. Then the Bell company became active. It endeavored, with a certain amount of success, to get the leaders of the Liberal party to oppose the law, while endorsing the principle of public ownership. The remarkable fact of the campaign is that none of the newspapers helping the Bell Company (and these were many) nor any public speaker uttered one word against public ownership of telephones or any other utility. On the other hand, each supported the principle, but urged the law to be defective and the government insincere and pleaded for a delay in the matter. During the last ten days of the campaign, the Bell official representation sent to each voter a circular stating that if the rate payers voted "yes," a tax would be spread by the municipality, and every one

*Editor's Note.—A report of this convention was published in The American Telephone Journal Dec. 1, 1906.

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would annually be taxed accordingly and prophesying a heavy burden on each, whether a telephone user or not. By every means at command, the Government endeavored to get word to the voters that such a statement was absolutely false, and that no tax would be spread—that only those subscribing for telephones would have to pay for them and only those so desiring would take the telephones.

As the campaign approached the end the weather grew worse. Most of the time during the last two weeks the thermometer ranged from five degrees to thirty-eight degrees below zero. The heaviest snowfall in many years is the record to date; the hard winds have filled the roads and throughout the provinces they have been almost impassable; the railroads have had great difficulty in keeping their lines in operation and most of the branches have been closed for a week or more. Under such conditions the campaigners pushed their respective causes. Previous to the storm the Bell company had sent its speakers to meetings arranged and paid for by the Government, and these Bell speakers insisted on being heard and in each such case made broad contradictions and misstatements to try and overcome the effect of the vast amount of information, given in the Government's interest, as to the growth and success of the Independent movement in the United States, and as to the results of municipal ownership in Great Britain, and particularly as to the value of the legislation enacted.

While a few of the Government officials and citizens of Manitoba addressed meetings in their own districts, the campaign was principally waged between the Bell agents and those for the Government, herein before named, led by Mr. Dagger. It was an exciting struggle. The *Free Press,* the oldest paper in Manitoba espousing the Bell cause, would permit nothing favorable to the Government's cause to appear, and led the attack on the proposed plan, using the Bell arguments freely. The *Telegram,* on the other hand, printed long reports of the meetings held in the Government's interest, and by strenuous efforts endeavored to prevent the campaign from becoming one of party politics.

At last the elections were held during a time of storms and zero weather and amid abuse and false statements for the corporation's interests. Naturally a light vote was polled and the returns have been very slow in arriving.

In general the results show as follows: Excepting Portage La Prairie (which ratified the plan and principle by a majority vote, but not by a 60 per cent. vote, thus failing to pass the by-law, nearly two-thirds of the cities, towns and villages voted favorably and passed the by-law. Winnipeg voted 3 to 1 in favor of public ownership; Brandon by 80 per cent. was favorable. Not including rural organizations, of 39 municipalities reporting, 26 passed the by-laws and adopted the public ownership of telephones.

About 65 per cent. of all votes cast, as reported, were for the legislation. However, many of the rural municipalties voted against the legislation owing largely to two things, undoubtedly, i. e., a belief that a tax would be spread, and the fact that having no telephone they did not appreciate the benefits to be derived. In those rural municipalities having telephones a large majority voted for public ownership.

The success of the Government in this election has been so marked that it has already announced that long distance lines will be begun at the earliest possible date in the coming spring and pushed with vigor; that the first line built will be from Winnipeg to Gretna (on the boundary) to connect with the Tri-State Telephone & Telegraph Co. of Minneapolis, this being the Long Distance Company of the Independent interests in Minnesota. Mr. Moulton, president of the Tri-State company, has already promised Premier R. P. Roblin, of Manitoba, to build the 40 miles of line necessary to reach the boundary and have it ready to connect with the Government's lines. Thus everything seems to indicate that by midsummer, Winnipeg will be conversing with Minneapolis and St. Paul over the Government's Independent system.

The Manitoba government plans to build 1,000 miles of long distance lines in 1907. Already it is looking for men and material. It is desired to get the long distance lines well under way before beginning the building of local exchanges, but without doubt such will be commenced during the year.

Meanwhile the Bell company is working crews through the cold weather and storms, in order to secure a footing that may enable it to retain its standing. Its rates are now $24 for farm telephones and, in villages and towns, $18 for residences and $24 to $30 for business telephones. In Winnipeg it has about 7,000 central energy telephones at $50 for business and $30 for residence telephones.

The Government offers to purchase the Bell property in Manitoba at its cash value plus 10 per cent. profit. Whether it will sell is a question, but inasmuch as the Government should be able and undoubtedly will give service at less rates than can a private corporation, it would appear that the Bell company must eventually sell out to the Government.

There is no doubt in the writer's mind that the present Government (Conservative) is not only pledged to push public ownership of telephones, but that Premier Roblin and each member of the Government Council is personally a firm believer in the advantages of such ownership to the people, and will do all in their power to establish it.

The election of the Provincial officials occurs in 1907. The legislature is called for early January, and, as pledged by the Government, amendments to the telephone legislation will be made and without doubt will greatly strengthen the law and the Government in its execution. Those keeping track of the important events in the telephone world will give very close attention to Manitoba during the coming months. It has made modern history in telephony and along new lines that may, and probably will, be the beginning of a vast movement in governmental and municipal ownership. Thus Manitoba, the smallest of the provinces of Canada, oppressed by the Liberal Party Government of the Dominion, has done that which may soon make it the mightiest and most conspicuous government for the people's rights upon the Western continent. Her telephone policy, even more than her wheat fields, may become world famous, and with greatest interest will her progress be watched.

HINTS TO EMPLOYEES.

SUGGESTIONS as to the proper conduct of telephone employees are frequently issued in various forms. Among the numerous codes which have been given out the following, compiled by H. E. Allen, Supt. of the Dayton, O., district of the Central Union Telephone Company, and recently published in the *Central Union News,* is especially praiseworthy, both in matter and in expression:

Don't forget that you represent the company and that a patron judges the company by your actions and work.

Don't be discourteous to anybody.

Don't argue with a patron, an operator or any employe over the telephone.

Don't under any circumstances allow a patron to get the impression that you are indifferent or disinterested.

Don't contradict a patron's statement; even if it is evident that he is in error.

Don't make promises that the company cannot fulfil, or make any adverse comments to subscribers about apparatus or the company's business.

Report any bad conditions you may find that you can not repair.

Don't forget to exercise politeness and courtesy at all times. Never lose your temper or allow any personal feeling to interfere with the proper discharge of your duties.

Don't fail to keep your personal appearance up to the mark. Walk smartly and avoid slouching. Conduct yourself generally as becomes a representative of this company.

Don't do poor work. "Good Service at Reasonable Rates" is our motto, and we cannot maintain this standard without your help with first-class workmanship.

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Don't make temporary repairs. Exceptions can be made only in case of absolute necessity, and then full report must be made on the back of your report so that the temporary repairs can be made permanent at the earliest possible moment.

Don't forget that all joints MUST be soldered.

Don't forget that your time costs money and money is what you get twice a month for doing your duty. Duty consists of serving this company honestly and faithfully at all times, and not wasting any of your time, thus saving the company's money.

Don't fail to save all pieces of material and apparatus. It all costs money. This includes fuses, duplex, triplex, arrester parts, copper wire, old McIntyre copper sleeves, etc., etc. Throw nothing away. If it can't be used over it can be sold as junk.

Don't Knock—Boost. If your experience suggests different methods from those in use by our company give them to your superiors. You will receive credit for them. SUGGESTIONS are always in order.

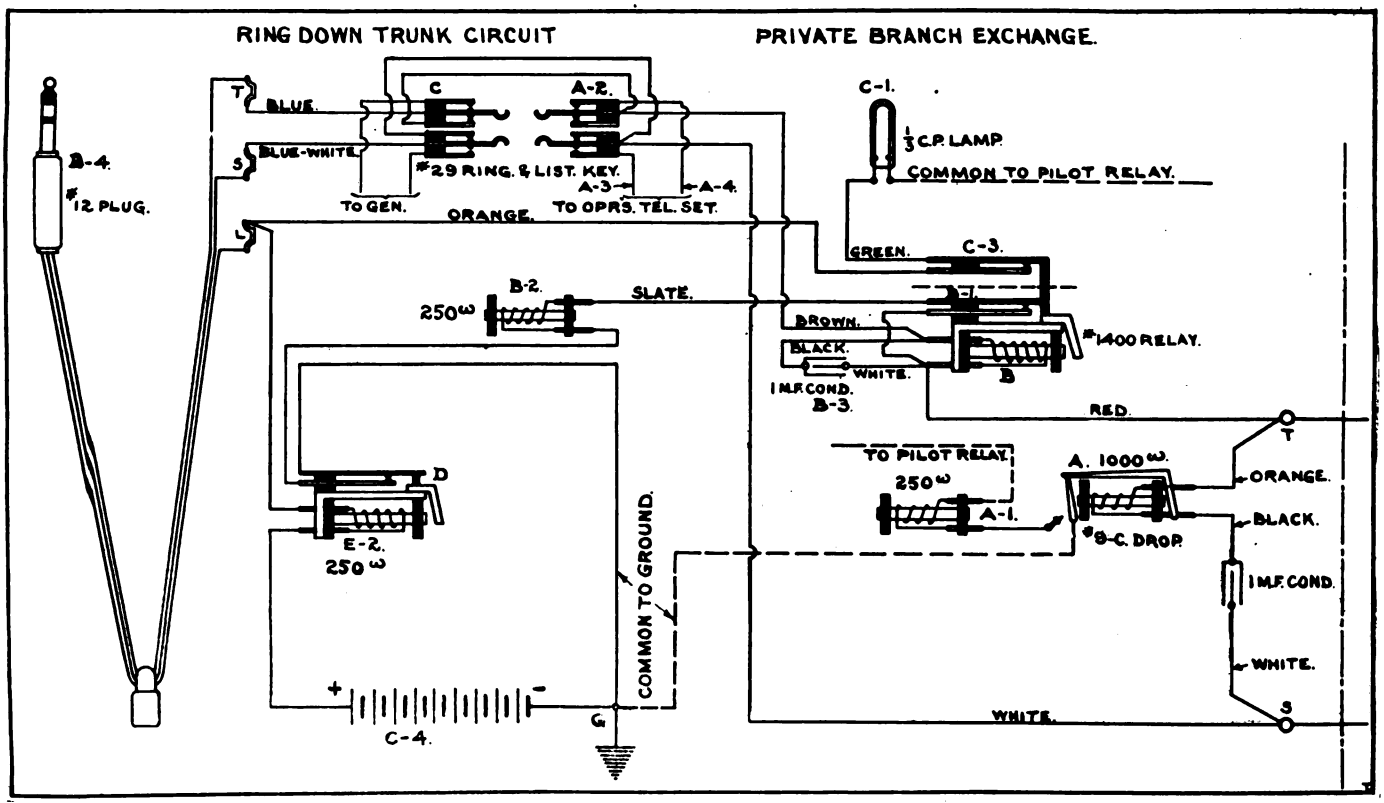
Don't be content to be an "average" workman. Strive to be the BEST.

Your promotion or increase of salary depends entirely upon the quality of your work. Look back at the men you know who have made a success of this or any other business and you will find that they are not the ones who keep their eyes on the clock or are only thinking about pay day.

A Private Branch Exchange Trunking Circuit

BY LOUIS MUHLHEIZLER, SUPERINTENDENT OF MAINTENANCE, PITTSBURG AND ALLEGHENY TELEPHONE COMPANY.

THE private branch exchange trunking circuit described in this article may be connected to a common battery central office in the same manner as any subscriber's telephone line, and may be operated under the same conditions. Suppose Brown & Company have a private branch exchange located at their place of business. To this private branch exchange are connected fifteen telephones. These telephones are operated locally at their private branch exchange the same as they would be at any larger exchange.



Branch Exchange Trunk Circuit Recently Designed by Mr. Mühlheisler.

In addition to the fifteen telephones there may be, for example, three trunk lines to the main exchange, connected to answering jacks, and also to multiples throughout the board. Any operator in the main exchange having a call for Brown & Company will test and ascertain whether the trunk called for is busy. Should the line called for by number be found busy the next trunk should be tested. If not busy the proper connection is made. After the plug is inserted in the multiple or answering jack at the main exchange the supervisory light on the operator's cord circuit burns. This goes to show that the line selected is at rest. The operator at the main exchange then rings on the circuit. This energizes the 1000 ohm drop *A*, which attracts the armature allowing the shutter to fall, which in turn connects a local circuit through *A*1, 250 ohms, energizing the pilot relay. This lights the pilot lamp, indicating a call, to be answered at once by the private branch exchange operator. The private branch operator throws her key, *A*2, forward. This connects in circuit her telephone set, which is the standard operators' telephone circuit used for this work. The secondary has in series a condenser. Across the common wires *A*3 and *A*4 is connected a retardation coil of 200 ohms, this now being a path for the current to flow which energizes relay *B*. When this takes place the contact on relay *B*1 is broken, and this releases the ground from the tip side of the circuit through the resistance *B*2. This operation puts out the supervisory lamp on the cord circuit at the main exchange. This shows that the private branch operator is on the circuit ready to take the call. The relay has a resistance of 100 ohms and the length of relay *B* is 2½ inches. This relay, *B*, is shunted with a 1 M. F. condenser, marked *B*3. The relay operates on a line resistance of 1000 ohms, which gives the necessary degree of sensitiveness. It is very necessary to have a sensitive relay for this work to operate under high resistance line conditions. The circuit operates on a 24 volt system or a higher voltage if desired. The 1 M. F. condenser *B*3 is in multiple with the winding on re-

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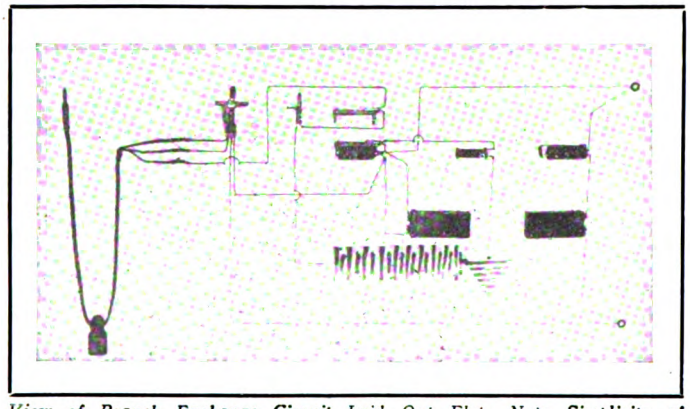
lay *B*. This is to shunt the path of resistance to voice currents. Also the effect is to balance the circuit for the prevention of cross talk and induction.

After learning the number of the party at the branch exchange with whom conversation is desired, his line is connected by inserting the 3-conductor plug *B*4 into the spring jack at the private branch exchange. Cord clips marked *"T"* and *"S"* are in the talking circuits. The cord clip marked *"L"* is in the local or lamp circuit. The operator, after inserting the plug into jack pulls the key *C* back. This operation connects to line the ringing generator current, which rings the telephone bell. It must not be forgotten that after the plug is inserted the 1-3



View of Branch Exchange Circuit, Laid Out Flat. Note Simplicity of Wiring.

C. P. lamp *C*1 burns. When the subscriber at the private branch exchange takes the receiver off the hook the lamp *C*1 goes out, indicating to the private branch operator that the subscriber at the end of the private lines has started conversation.

The battery that energizes the telephone at the private branch exchange is supplied from the cord circuit at the main exchange, there being no repeating coils or other apparatus in the talking circuit at the private branch exchange, except relay *B*, which is shunted with a 1 M. F. condenser. The operation of relay *E*2 is effected when the plug is inserted into the spring jack. This feature is especially worthy of attention. When the plug *B*4 is inserted into the jack the sleeve *L* of the plug is grounded, and the circuit for the supervisory lamp C1 is thus completed. When the relay *B* is energized the contact *C*3 is broken, putting out the lamp *C*1. There is also attached to the sleeve of plug *B*4 one side of winding of relay *E*2, 250 ohms. The other side of winding of relay *E*2 is attached to battery *C*4. When plug *B*4 is inserted into the jack, the sleeve being grounded, the relay *E*2 is energized, attracting the armature which raises the contact spring *D*, breaking the ground on the tip side of the circuit, thereby not attracting the main operators' attention until the branch operator disconnects the circuit. The effect of this is to make it possible to hold the private branch operator responsible for mistakes. The relay *E*2, however, can be omitted and good service obtained.

An essential feature of this branch exchange circuit is that by which any party at the private branch exchange who desires a connection to the main exchange at night may have the operator at the private branch exchange put up the connection before going home at night, and throw the battery switch. The trunk circuit now operates with the removal of the receiver from the hook of the telephone at the private branch exchange the same as any telephone connected with the main exchange. The main operator can ring the telephone bells over the trunk line and the supervisory signal is actuated the same as with any other telephone connected directly with the main exchange.

While this circuit was designed to operate on an exchange system that uses ground supervisory, this same circuit can be used on any common battery system by making just one change. The writer will let the reader figure this out.

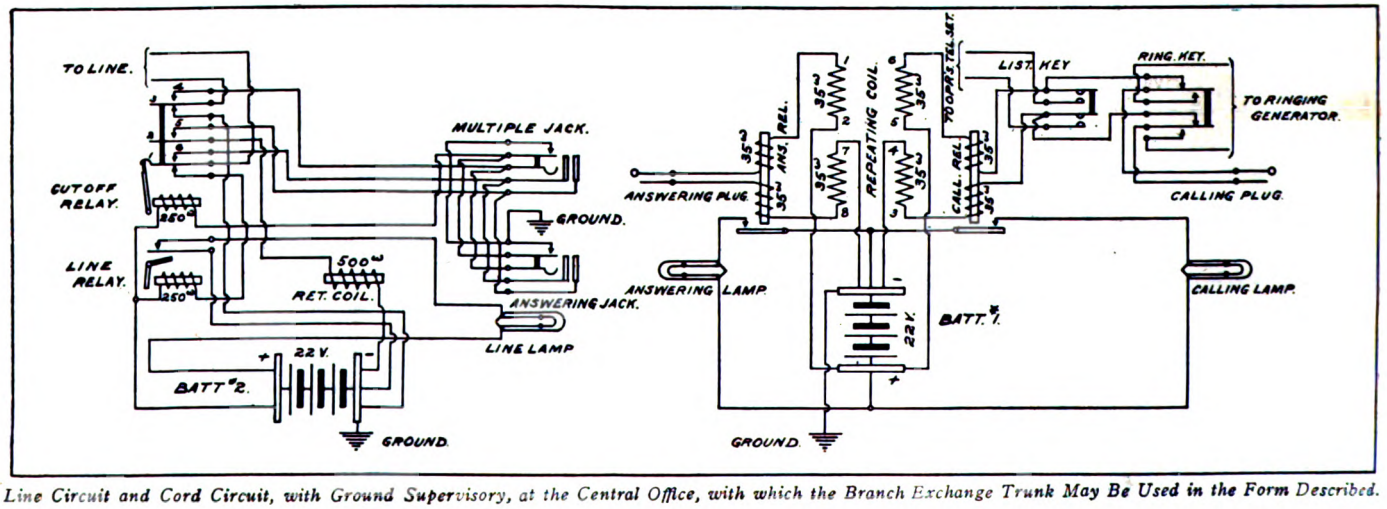
OFFICIAL BULLETIN NUMBER SIX OF THE INTERNATIONAL INDEPENDENT TELEPHONE ASSOCIATION OF AMERICA.

Second Series

THE YEAR'S WORK—GOOD RESOLUTIONS:

Nothing is more gratifying or encouraging than the knowledge of deserved success. Looking back at the close of 1906, the greatest year in the history of Independent Telephony, and reviewing the progress of the past twelve months, the Independent people have reason to congratulate themselves on the successful results of their earnest work, and can face the future with hopeful assurance, knowing it has still greater things in store for them.

The year just ending has witnessed the greatest telephone convention ever held, the good effects of which are still apparent in the increased interest being taken in district and state organizations in every part of the country. It has seen the Independent companies extending their service in all directions, successfully competing with established monopoly in opening new exchanges, and developing thousands of miles of new territory with rural service and toll lines, the new companies compelling the old to give better service, more courteous treatment and reasonable rates, driving it entirely out of business in some sections where it had refused to recognize its duty to the public. Approximately half a million telephones have been added to the Independent list, bringing the total up to nearly 3,500,000. There has been a wonderful awakening of public interest in the Independent movement, and for the first time perhaps the readers of leading periodicals and great daily papers have been given an opportunity to get *facts* regarding this great industry, its wonderful development and possibilities.



Line Circuit and Cord Circuit, with Ground Supervisory, at the Central Office, with which the Branch Exchange Trunk May Be Used in the Form Described.

Never before in a single year have so many franchises for important cities been granted the Independents. San Francisco, Detroit, Milwaukee, Omaha, Denver, and Brockton, Mass., are among the cities whose citizens have recognized the value of com-

(*Continued on page 424.*)

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QUERIES

KICK COIL TELEPHONE.—(806.)

We should like to learn, through your queries column, from anyone who has had experience with the so-called "kick-coil" telephone as a substitute for the magneto instrument.

THE above request of a subscriber was published last week. The editor has received a response from a well known engineer who claims to be able to qualify for his reply according to the terms of the query, by his experience, and who speaks out of the fulness thereof. Here is what he says:

"About every so often some enthusiastic Independent conceives the idea of revolutionizing telephony so far as the magneto end of it is concerned and devises some new style of 'kick coil instrument.' By this term is meant one by which the operator on a magneto drop board may be signaled without the use of a generator at the subscriber's station. Because it is just about 'every so often' the exchange manager persuades himself, or some salesman does it for him, that this time the proposition has really been solved, and into a number of these instruments goes his 'hard earned,' he to discover only too soon that it is a case of 'Stung again, by Heck.' Not only does the operator get stung, but so also does the manufacturer, who, experiencing an initial rush on the instrument, loads up on special tools and material, the mention of which at a later date is amply sufficient to instill a hearty dislike for the one who had the unmitigated audacity to suggest such a thing in the first place.

"The different concoctions of this sort are legion, but as a cold blooded business proposition do not trust them any further than you can fling Taurus by the tail. On account of the multiplicity of these I will not deal with them all but simply take as an example one of the most recent, supposing that because it is one of the latest it represents the highest stage to which the idea is advanced.

"The idea featured in this is the common one, that is to use the talking battery as a means for actuating the switchboard drop. But as the talking battery has not sufficient voltage in itself to force enough current through the line resistance to cause an actuation of the drop, it was found necessary to supply some means for so transforming the existing conditions as to allow of the desired result being obtained.

"For this purpose a specially constructed coil is placed in the instrument. This coil is in reality a 'step up' transformer, that is, it increases the voltage and incidentally decreases the amperage. As the output of a transformer is in direct relation to the ratio of the number of turns in its primary to the number in its secondary, it was deemed necessary to make the primary of as low resistance and few turns as possible and the secondary just the reverse. So this coil was made with a primary of No. 18 copper wire of one-half ohm resistance and the secondary of No. 24 copper wire of one thousand ohms resistance.

"The object was to include the primary side of this coil in the battery circuit for a short period on the upward movement of the receiver hook, depending upon the impulse of high voltage from the secondary to cause the switchboard drop to actuate. Figure 806-*a* shows the diagram of the circuit of an instrument so arranged.

"Greed for force brought in the first obstacle. The one-half ohm of the primary is not much of a hindrance to the flow of current and naturally the draw is just about equal to that of a first class short circuit. Of course the contact is only momentary, but it does not take more than a few dozen calls to raise Hob with the strength of the dry cells, which we all agree is needed for talking purposes.

"Next came the discovery that when two kick coil instruments are connected through the switchboard and the resistance of the clearing out drop is the same or less than of the ringers on the instruments, the called subscriber upon answering will actuate the clearing out drop, thus advising the operator that the conversation is terminated before it has commenced. If she be one of the genus diligent the operator will immediately sever the connection, thus advertising the good service afforded by the company and materially assisting the subscriber in strengthening and enlarging his profanic vocabulary.

"From an economic standpoint it is advantageous in a magneto system to place series instruments on the single subscriber lines in town, but on longer and more heavily loaded lines use a bridging instrument of higher resistance than the series ringers. Imagine now, dear reader, the delight you would manifest when upon finishing a conversation with one of your local friends, the proud possessor of a series instrument, you attempt to gain the attention of the operator for a hurry call somewhere else, and although you right manfully jiggle the hook, never a peep makes she, for she has been admonished against the evils of working the listening key and to always wait for the clearing out signal. However, you do get your former friend back again and again because his bell doth jingle right merrily owing to the fact that the old truth holds good, and electricity takes the path of the least resistance, which in this case is through his 80 ohm bell rather than the clearing out drop in the central office.

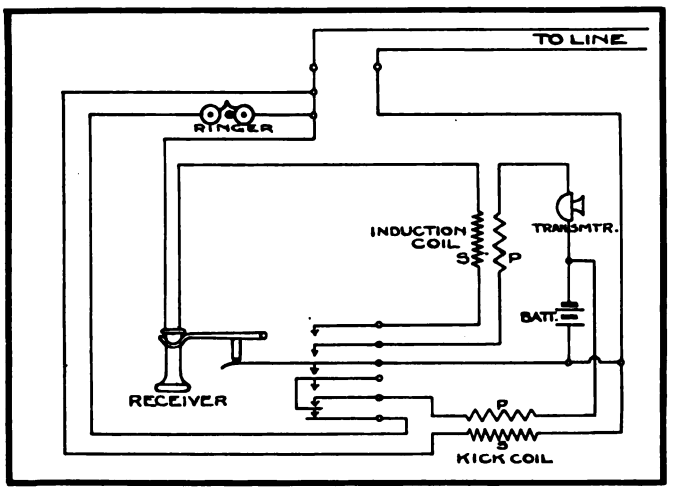

Fig. 806-*a*.

"And last, but not least, send your trouble man around to one of these instruments and when he unwittingly gets a screwdriver or a pair of pliers across the right springs in the hook switch, he most assuredly will be possessed of the idea that that irascible and implacable brute—that incarnate thunderbolt—that monster of the upper deck—an old and horny headed ram, has struck him fair and hard, at which he will inform you in terms in no manner effeminate that you may have your choice of either changing your brand of instruments or forthwith put out the placard for another bug-shooter.

"But seldom is anything created for which there is not at some time some use to which it may be placed to advantage. So when you have removed all of the instruments of the kick coil variety, again secured the confidence of your subscribers and explained away the belligerent attitude of your trouble man, just quietly remove one or two of these patience provokers, the kick coil, from the instruments and save them against the day when your faithful pole changer shall go on a tantrum, as pole changers sometimes do, notwithstanding the claims of our Warner friends to the contrary; for connected up in the manners shown in diagrams 806-*b* and 806-*c*, they will carry you over the time of waiting for a new set of springs or a new condenser for the pole changer.

(*Continued on page* 424.)

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THE EDITOR'S PAGE

THE DECISION OF MANITOBA.

EXTRAORDINARY not alone for the extent of territory in which the Bell Telephone interests have been deprived of monopolistic rights, but also for the vigor and completeness of the expression of public condemnation of the telephone monopoly, has been the recent election in the Canadian Province of Manitoba. The campaign which preceded this decision will long stand as an example of what can, in a comparatively brief time, be done in the way of equipping a public not closely in touch with the general trend of telephone development with the information necessary for dealing with so important a subject.

Readers of the AMERICAN TELEPHONE JOURNAL are fortunate in having an account of the campaign in the words of Mr. Ware. Called by Mr. Dagger to aid in the great educational mission which was about to be carried on, he went from his home at Grand Rapids to Winnipeg on October 23d, and remained in Manitoba until after the election. He took a prominent part in the immensely important conference on the telephone question held by the representatives of the municipalities at Portage La Prairie. Later he made addresses in all the most important cities and towns, and was assigned as champion of the government's policy against the strongest Bell advocates. Newspaper reports and other sources of information show that the results attained were due in no small measure to his wide and thorough knowledge of the telephone business in all its phases, of which telephone men on this side of the boundary are well aware. His account gives, in its suggestion of the difficulties and great personal inconveniences endured by the advocates of the government policy, an interesting light upon the spirit in which the extension of the benefits of independent telephone lines was undertaken by the men who have been so instrumental in building up in the United States a system in opposition to the same interests which have received so severe a set-back in Canada.

The success of the campaign was signal and gratifying. Concerning the few localities in which the government received less than the general amount of support, Mr. Ware offers a comment worthy of careful attention. He states that the greater number of people, having had no telephones, did not appreciate their advantages. It is thus evident that they did not think the telephone question a matter which directly and strongly concerned them. The Bell Company was able to actually derive support from what should have been, and in many places has been, the weakest point in its relations with the public. Had there been more time this question could have been conclusively settled. A correct and thorough understanding of the economic and social effects of an inactive policy which retards telephone development would undoubtedly have brought the government even heartier support than it has received. In view of the early failure of the telephone company to provide the facilities which were so urgently needed—merely to increase its business in response to a demand, rather than to push its affairs vigorously—the present frantic efforts at building are rather amusing. The spectacle of construction crews at work in the snow in a frenzied effort to reduce the losses brought upon their employers by a deliberate policy of negligence will probably not go far toward winning back the approbation of the thinking men who have made and recorded their decision.

Now that Manitoba has pledged itself to the policy of providing for its people a comprehensive and economical telephone service it has assumed a position without a precedent. The immediate creation of a telephone system which must be financed, engineered and constructed to give at its inception an adequate service to the people of an entire State is a new problem. Courage and enthusiasm and sober, careful judgment have all been shown in the preliminary consideration of this great telephone question. The government freely called upon men of experience for aid in its campaign. It is to be hoped that in the actual carrying out of its policy it will be no less eager to secure such advice as will enable it to proceed on the most substantial lines. With such great possibilities for error, and so remarkable an opportunity for a success which will win the admiration of the world, no step should be taken without the most exact knowledge of its significance.

TAKING CHANCES ON THE STORMS.

EVERY winter there come from many parts of the country reports of the tremendous damage to telephone interests wrought by sleet and snow storms. Losses are sudden and heavy, and are inflicted under circumstances which make them particularly hard to bear.

From the point of view of the telephone subscriber the conditions thus created are especially burdensome. During severe weather traveling is avoided as much as possible, and reliance is placed upon the telephone for nearly all communication with either near-by or remote points. The loss of this service is an inconvenience so serious that it produces a deep impression. And always the tendency is to blame the telephone company. Even if the storm is so severe as to make the plea that it was impossible to foresee and build lines to withstand its energy there is always the opening for complaint in regard to the slowness of making repairs. When the manager needs to expend all his time and energy in getting things working he must still devote a great deal of attention to pacifying his discontented subscribers.

The losses to a company in such a time are hard to figure accurately. They naturally divide themselves into several distinct classes, and in some of these classes can by no means be definitely fixed. The simplest form of loss is that measured by the outlay for replacing the material thrown out of position or completely ruined. This is sufficiently heavy to deserve careful consideration, owing to the difficulties of obtaining material, high cost of labor for rush repairs in bad weather, and the fact that much of the work done at such a time must be done in a temporary manner, to be later replaced by a more permanent form. The loss from injury to the service is probably even greater, and certainly more likely to permanently injure the telephone company. Rebates for the time telephones are out of use must frequently be granted. When there are two competing companies, and only one has its lines severely crippled, its opponent is likely to reap an immense advantage from the disaster. Under these circumstances it behooves every company operating in a territory where such storms are liable to occur to give careful attention to the only adequate form of insurance—good construction. With a view to obtaining data which will be useful to all companies anxious to obtain definite information on this subject, THE AMERICAN TELEPHONE JOURNAL has offered prizes for a series of articles, to be prepared under conditions stated on another page. In order that this may bring results it is essential that plans for the proper action be made before the storms occur. It is hoped that telephone men will promote this contest with enthusiasm, and decide to do so now, so that when the time for quick action comes they may be prepared.

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THE TELEPHONE IN THE COURTS

CONDUCTED BY A. H. McMILLAN

Readers are invited to submit questions on any point of Telephone Law. They will be answered and explained on this page.

RESTRAINING INJUNCTION WHERE SOIL IS NOT INTERFERED WITH.

In correcting some of our lines and shortening them we cut across the corner of some vacant property in order to avoid some poles which stood on the corner belonging to an electric company. The corner lot belongs to a non-resident of the county, and, although the wire was strung over his land, the poles were not planted in the ground on his property and the soil belonging to him was in no way interfered with. Under these circumstances would he have any right to make us pay for the privilege of building over his land in that way? J. G. D.

THE theory is that a man who owns the soil owns from the center of the earth to the heavens, and the owner of the land in the case you mentioned would have a right by injunction or otherwise to prevent you from building over his land even though you did not interfere in the least with the soil. This was so held in New York in a statute defining ejectment as an action to recover the immediate possession of real property. Code Civil Procedure, Sec. 3343 Subd. 20; Butler v. Frontier Telephone Co., 109 App. Div. 217, 95 N. Y. S. 684.

WHEN CONTINUED OCCUPANCY GIVES RIGHT IN STREETS.

Although our telephone company had no authority in the first place, from the city, to erect its lines and string its wires in the streets, yet it did so without objection on the part of the municipal authorities, and has now had its lines in the streets for over sixteen years. During that time, we have spent great sums of money in improvements, and the city has passed various ordinances regulating the poles and wires, and the manner in which they shall be put up, and has even used the poles for the purpose of stringing its fire alarm wires upon them. They now talk of requiring us to vacate the streets, but this is being done at the instance of another company that is being organized and wishes to get exclusive rights in the streets. Will you tell us whether or not we have acquired a right to be where we are by the length of time of our occupancy? A. J. S.

WE believe that a bill of complaint on the part of the city to compel your company to remove its poles and wires would be dismissed for laches. Laches is a neglect to do the proper thing at the proper time. In this case, the laches of the city consists in its failure to object to the occupancy of the streets by the company when the poles were first erected and before the company had spent large sums upon its line. A similar case once arose in Pennsylvania, entitled City of Bradford v. New York & P. Tel. & T. Co., 206 Pa. 582.

NORTHWESTERN TELEPHONE COMPANY BARRED OUT OF THIEF RIVER FALLS.

THE Northwestern Telephone Company brought mandamus proceedings to compel the officers of Thief River Falls to cease interfering with the construction work planned by the telephone company. After elaborate argument the court held that the company could not install a system in the municipality under its present charter.

INJUNCTION TO PREVENT CUTTING OF LINES.

BECAUSE the Swayzee Co-operative Telephone Company at Marion, Ind., had threatened to cut the telephone lines between Converse and Swayzee, connecting the Swayzee and Converse telephone systems, the Converse Telephone Company has filed in the circuit court a complaint asking for a restraining order to be issued against the Swayzee Co-operative Telephone Company to prevent it from cutting the lines. The Swayzee and Converse telephone companies had entered into a contract by which the lines were joined two miles north of Swayzee. The Swayzee company declares that the contract has expired, and now wants to break off business relations. The Converse company holds that the contract has not expired, and in order to protect its subscribers brought the action in court. The injunction has been issued temporarily.

Reading between the lines of the complaint it seems the matter is really a continuing of the fight of the Bell Telephone Company against the Converse company.

PROPOSED COLLECTION FEE ON DELINQUENT ACCOUNTS.

AN amendment to the franchise ordinance of the Tri-State Telephone Company of Minneapolis, Minn., so as to permit the company to charge a collection fee of 25 cents on delinquent accounts is proposed. The telephone company explains that a collection charge is essential. It has become a habit among patrons not to pay telephone bills until the collector comes around, with the result that the company is now employing fifteen or more collectors and the service is costing $10,000 a year, which is considered an unnecessary waste of money. The company has already been trying the plan of a collection fee but an objection has been made that the fee is illegal as it makes the telephone rate in excess of the maximum rental established by the franchise. Hence the amendment is proposed.

INJUNCTION WILL NOT LIE WHERE BOND IS GIVEN.

In carrying on some new construction work in this county we have given a bond to cover damages arising from the construction of lines abutting on the lands of private owners. We have not yet obtained the consent of the county authorities to use this road, but expect soon to have such consent, as we are only waiting for the necessary notice to be given to make our ordinance valid. One of the farmers along the way has threatened to get out an injunction to stop our work. Has he any case against us when he is protected by the bond? H. S.

ALTHOUGH the public authorities might complain at your beginning your construction before they had granted you permission to go to work, it does not follow that the land owner would have a right to interfere with your work. So far as he is concerned he is fully protected by your bond and has no cause to complain. A holding to this effect was made in the case of Pfoutz v. Pennsylvania Telephone Company, 24 Pa. Super. Ct. 105.

CITY SUES FOR PERCENTAGES DUE UNDER TAX LAWS.

SUIT has been brought by the city of Jamestown, N. Y., against the Home Telephone Company to recover several thousand dollars in percentages due the city. This money is the percentage of the gross receipts of the company which the city should receive according to the contract executed when the Home Telephone Company was given a franchise.

The telephone company alleges that it does not have to pay the percentage because in a section of the franchise law it is stated that a company can deduct the percentage from the amount of the franchise tax, but the city's contract with the Home Telephone Company seems to be aimed to subvent any such stand by the company. When the company got the permission to operate in Jamestown, it waived the right to take advantage of this section in the franchise law.

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IN THE OPERATING FIELD

CONTINUED GROWTH OF INDEPENDENT COMPANY AT GREEN BAY, WIS., INDICATED BY NEW DIRECTORY.

EIGHT hundred telephones were connected to the lines of the Fox River Telephone & Telegraph Company in the cities of Green Bay and De Pere, Wis., when its first directory was issued. Now the number of subscribers in these two places has increased to 1,600. Of these a great many are upon farmer's lines, of which no less than 100 miles radiate in different directions from the cities above mentioned. An increase of two hundred per cent. for the small exchange at Wrightstown is shown since the last directory was issued.

An interesting and useful feature of the present book is the use of the inside cover for a list of names of the physicians of the city, so that in case of accidents or sickness they will be most conveniently located for ready reference. On the back cover appear complete time tables for trains on the railroads entering the city, and numbers of fire alarm boxes, with instructions for sending alarms.

STATE OF LOUISIANA PAYS BILLS TO BELL COMPANY UNDER PROTEST.

GOVERNOR BLANCHARD, of Louisiana, has made a vigorous complaint against the charges which the Cumberland Telephone Company is making on its long distance messages. He has served notice on the management of the company through its Baton Rouge office that all bills over the rate authorized by the Railroad Commission will be paid under protest and money demanded back if the Commission wins the injunction suit now in the courts through which the Cumberland Company is holding up the rates.

The governor sent the following letter to the manager at Baton Rouge:

Cumberland Telephone and Telegraph Company, Baton Rouge, La.:

Gentlemen—The Railroad Commission of Louisiana, during the present year, ordered reductions in telephone rates. Your company, instead of complying with this ruling of the commission, is charging the old rates which obtained before the reductions were ordered, and I understand the company has gone into the court and enjoined the commission from putting into effect the reduced rates ordered by the commission.

The telephone bills your company is rendering this office in the matter of rates charged adhere to the old high rates and do not conform to the reduced rates ordered by the commission.

This letter is to notify you, and I speak for all the departments and the institutions of the State Government here and elsewhere in the State, that the State of Louisiana, in its several departments and institutions, in paying your bills handed in at rates in excess of what the commission has ordered, pay the same under protest, and you are notified that in the event that courts to which you have appealed sustain the commission rates as reasonable the State will demand back from your company an amount equal to the excess of charges made by you over the rates as fixed by the commission.

It is expected that similar protests will be made in other quarters now that the Governor has set the example.

INDEPENDENT LONG DISTANCE LINES TO BE CONSTRUCTED BY NEW COMPANY IN MEXICO.

A NETWORK of long distance telephone lines and local telephone systems in all of the principal cities and towns in the State of Vera Cruz is to be constructed by a company of Mexican and foreign capitalists which is being organized for the purpose. Manuel S. de Corbera and J. Sitzenstatten, both of Mexico City, have obtained a concession from the state government of Vera Cruz for the proposed enterprise. Mr. Sitzenstatten is a prominent electrical engineer who has had much experience in Sweden and Mexico in constructing telephone systems and whose name is well known to AMERICAN TELEPHONE JOURNAL readers.

It is announced that several hundred thousand dollars will be invested in the enterprise. The terms of the concession provide that the work of constructing the system must begin within eighteen months. It is stated by Messrs. Corbera and Sitzenstatten that as soon as the details for the organization of the company are completed the work of installing an underground telephone system in the city of Vera Cruz will be commenced. This will be within the next few weeks. All of the principal streets of Vera Cruz are to be paved with asphalt and it is desired that the work of laying the underground telephone conduits shall be done before the paving work is begun. It is also planned to install local telephone exchanges in the cities of Cordova, Orizaba, Jalapa and a number of smaller towns. All of these cities will be connected by long distance lines. The company will erect its own factory for manufacturing conduits.

There are many large sugar and coffee plantations in the state of Vera Cruz, and it is believed by the promoters of this enterprise that many of them will be glad to have telephone connection with the outside world.

BELL COMPANY OBLIGED TO POSTPONE RAISE IN RATES.

THE Pioneer Telephone Company (Bell), which operates in Oklahoma, recently announced that its rates in the city of Shawnee would be raised. This announcement came at a time when the patrons of the company were very much dissatisfied on account of the alleged poor quality of the service, and the statement that the cost of connections would be increased provoked a storm of protest. Subscribers were unanimous in denouncing the policy of the company, and at a meeting of one hundred business men, held at the Chamber of Commerce, all objected to the poor service, and also to their inability to get telephones installed promptly. The company decided to postpone the increase in rates.

INDEPENDENT TELEPHONE DEVELOPMENT IN INDIANA AS SHOWN BY RETURNS FOR TAXATION PURPOSES.

AN exceptionally satisfactory growth in the Independent telephone systems of Indiana as shown by the returns which have been recently made public by the State Tax Board. A comparison with figures for 1905 shows an increase in the number of Independent telephones from 145,030 to 182,180. This extension of the systems was accompanied by a corresponding increase in the gross earnings from $2,430,191.22 to $2,802,564.79, with an amount of net earnings of the difference between $476,839.98 for 1906 and the corresponding figures of $429,043.80 for 1905. A feature which indicates the general trend toward sounder financial methods, which is becoming prevalent in all parts of the country, is shown by the fact that the amount of improvements paid for out of the earnings was less in 1906 than for the previous year.

NEW INDEPENDENT EXCHANGE TO BE BUILT AT FULTON, NEW YORK.

PLANS have been completed for a new three story building to be occupied by the Independent telephone company of Fulton, N. Y. In this will be installed a 2,000 line capacity switchboard, with equipment to take care of the 1,000 subscribers who are expected to be connected to the system by the time it is completed. The outside lines are to be distributed through underground cables in the business and residence sections. Besides the town subscribers, arrangements have been made to connect with about 700 telephones in the county, and

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new toll lines will be built to Syracuse, Mexico, Oswego and Hannibal. As toll lines from these points lead to a very complete network of Independent lines throughout upper and Western New York the subscribers to the new exchange will from the beginning be able to command a toll service having a very wide range.

The officers of this company, which goes under the name of the Oswego County Independent Telephone Company, are among the most prominent men in the city. Under the title of general manager and secretary, M. Stanley Powell, who built the Independent plant in Clinton, N. Y., which has so thoroughly won the favor of the telephone using public, will have the active management of the company at Fulton.

PHOTOGRAPHIC PRIZE CONTEST

OPEN DURING SLEET AND SNOW SEASON.

TO show how the danger of losses from sleet and storms may be diminished by proper original construction of telephone lines, THE AMERICAN TELEPHONE JOURNAL offers a group of prizes for the best three articles on the subject presented before the first of next April. These articles must describe the effects of an actual accident, resulting from the loading of wire, cables or fixtures with sleet or snow.

Each article must be accompanied by one or more photographs of the sleet-covered equipment, taken during the present winter, immediately after its fall. Articles must describe fully the nature of the load on supports, telling why they failed. The form of construction which the author believes would probably have been most effective in preventing the loss, with reasons for his belief, must be described. Particulars as to the effect on service, such as number of lines out, length of time interrupted, number of complaints, any advantages gained by competitors not subject to such interruption at the same time, and losses due to rebates to subscribers whose lines were put out of service, should, if possible, be included, in order to give sufficient information to enable readers to form an approximate idea of the actual cost of damage, from the broadest point of view. The actual cost of material and labor for making repairs would of course be desirable.

Articles must not exceed 2,000 words in length. Awards of $20, $15 and $10 will be made for the first, second and third prizes, respectively. Payment for any other articles received will be made at regular rates if accepted for publication, so that the time expended by any contributor of good material will bring him due compensation. THE AMERICAN TELEPHONE JOURNAL reserves the right to refrain from considering the author of any article as a candidate for a prize if the material submitted cannot be developed into a form acceptable for publication. Each article must deal with a single case of line failure. Any person may contribute as many separate articles as he wishes, provided they deal with separate subjects. Awards will be made as soon as possible after April 1st. Judgment will be based on the merits of photographs and articles from a strictly practical standpoint, on the value of the facts they present, and not on the mere wording of the articles. No discrimination against an article on account of lack of literary style will be made.

Telephone men are urged to be on the alert for all opportunities to take advantage of this offer, obtain all material made available by destruction of lines throughout the winter, and forward contributions as soon as made up.

For further information write to the Editor, AMERICAN TELEPHONE JOURNAL, 100 William street, New York City.

BELL SERVICE REJECTED IN HATTIESBURG, MISSISSIPPI.

SINCE receiving the notice that the Cumberland Telephone & Telegraph Company (Bell) intends to raise its rates in Hattiesburg, Miss., telephone users in that city have been engaged in making preparations to do without the company's service. Business men have signed an agreement providing for the removal of all Cumberland instruments at the end of this month. The Perry County Medical Society has adopted resolutions to the effect that its members would cease using the Cumberland lines. The city council adopted a resolution calling for the removal of the Bell wires from the city's offices if charges are advanced on the first of January, as was announced. It is said that the Independent company in Hattiesburg is rushing the extensions of its lines to take care of the increased business which is expected.

MIDNIGHT CONSTRUCTION BY BELL COMPANY AROUSES IRE OF AUTHORITIES AT ROCHESTER, IND.

LITIGATION threatens the city government of Rochester, Indiana. The trouble follows the granting of a telephone franchise to a local company nearly a year ago and the recent sale of this company to the Bell company before it had begun to install a plant.

On the afternoon of Dec. 14 representatives of the Bell company brought a force of men to Rochester and commenced work on putting in a new plant, ignoring the clause in the franchise which provides that the telephone poles shall be put in under the direction of the City Council.

When the Council heard this a meeting was called, in which the franchise, which was due to expire Jan. 1, 1907, was revoked. An order was also issued to the police officers to compel the Bell company to refrain from construction work. Instead of obeying the order the Bell company began work at midnight, and planted a number of poles before the officers discovered what was going on.

Early the next morning the City Marshal and a force of men pulled down the poles and moved them back to the railroad yard. The Home Telephone Company and the Home Electric Company of Rochester then employed all the leading law firms of the city to fight the Bell, and representatives of the latter company and their workmen left the city, and are now threatening to bring suit against the city and against the men who took down their poles. The city authorities say there is no ground for a suit and if one is to be brought they do not fear results.

A NOVEL TRANSMITTER.

(*Continued from page* 414.)

sistance under the above conditions will result in a decrease in current intensity amounting to $\frac{3}{7.6}$, that is .0053 amp.

In the case of an increase in resistance amounting to 2 ohms, that is to 20 times the above, the decrease in current intensity should accordingly be .106 amperes, whereas in reality it is .0842 amp. This shows the ratio between the calculated decrease (corresponding to proportionality) and the real decrease to be 1000:1259.

For a decrease of .1 ohm in the resistance, an increase in current intensity of 3:7.4 = .4054, that is .0054 amp., will be found.

For a decrease in resistance of 2 ohms, that is 20 times the above, the proportional increase in current intensity would thus be .108 amp.

In reality, however, this as above shown is only .1454 amp.

The ratio of the two above figures is 1346:1000.

This in the case of ordinary transmitters is shown by the fact that the sound, whenever the words are spoken too loudly against the diaphragm, becomes squeaking and indistinct. Now the necessity of speaking as loudly as possible turns up, especially in the case of long-distance communications when the sound is found to arrive with small intensity from the other station.

It is true that outside of this proportionality in the alteration of current intensity, other factors will influence the distinct transmission. In the present case these are, however, believed to be of secondary importance. The construction of the patented microphone above described, to sum up its effect, enables the number of contacts to be increased within rather wide limits, thus allowing a strong battery to be used, which in turn will result in stronger sound effects.

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OFFICIAL BULLETIN NO. 6 OF THE INTERNATIONAL INDEPENDENT TELEPHONE ASSOCIATION OF AMERICA.

(*Continued from page* 418.)

petition in telephone service, and have decided, in some cases by a popular vote, to no longer submit to a monopoly. Scores of smaller places have likewise welcomed the Independents, and everywhere people are beginning to appreciate the benefit of the greatest modern convenience, the telephone, and to realize that the Independent companies are entitled to their thanks and support for having placed it within their reach.

The "Chicago situation" is being taken care of, and franchises are pending, in some cases having been granted subject to executive approval, in nearly all of the few larger cities of the country which are still deprived of competition. Within the next twelve months it is safe to say that most of these will be included in the Independent ranks.

A spirit of greater fairness regarding the movement is in evidence everywhere among Municipal officials, due, no doubt, to a better understanding of the situation. Mr. Harry P. Nichols, Chief Engineer of the Bureau of Franchises of New York City, in reporting to the Mayor on the result of his investigation in telephone conditions throughout the country, points out the beneficial results of telephone competition, including an enormous extension of the telephone, with more reasonable rates, better service and treatment to the subscribers of both companies. This document is in strong contrast to a report previously made by a commercial organization of the metropolis.

The progress of the movement has not been confined to our own country. Spurred by the example of their associates here, the Independents of Canada have organized, held a successful convention and affiliated with the International Independent Association. The movement in Canada is making rapid progress. So strong has been the grip of the monopoly, and so unbearable its conduct in the Province of Manitoba, that the Provincial Government there, backed by popular approval, is to take the initiative in establishing competing telephone systems.

It must be apparent to all who have studied the situation, that the great progress of the movement in the past year, and the splendid condition of the Independents at present, is due in a large measure to the efficient work of their International, State and District organizations. The Independents have been taught the need of co-operation, and have been brought to realize as never before their community of interests and the necessity of working together without friction.

Our past progress has little more than shown us our future possibilities. If we pull together, as we should, there is no limit to what we may accomplish, and the progress of 1907 will be far ahead of that for the year just passed.

The Association wishes all of its members the compliments

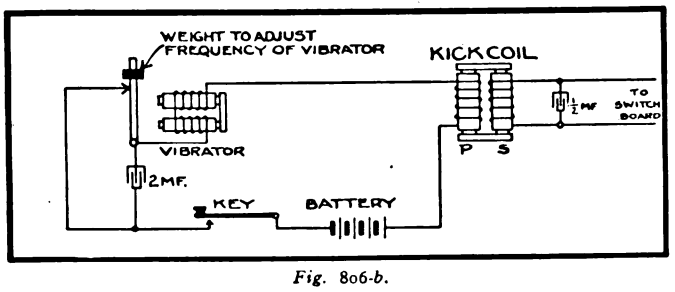

Fig. 806-*b.*

of the season, and exhorts them to remember their watchword, "Look for the Shield."

MAPS.

If you could only be convinced how important it is that you send us that map of your toll lines, you would mail it to-day. Why don't you?

SHIELD ADVERTISING.

Did it ever occur to you that by your failure to display the "Shield" at your pay stations you are driving many prospective customers to the "other fellow"? You never saw a Bell station without its sign, did you? That company realizes the value of signs as business getters. Wouldn't it pay you to display "Shield" signs and leave your friends in no doubt as to where your service can be had? The Supply Department can furnish signs or any other "Shield" things you may want. Order to-day.

KICK COIL TELEPHONE.

(*Continued from page* 419.)

"You will find that from five to ten dry cells will give you power enough to ring all of the instruments on your longest farmer lines as well as those locally situated.

"The wires as marked 'To switchboard' should be connected to the same posts as the wire from the pole changer. However, it will be necessary to also place the key in reach of the operator so that she may close it when she desires to ring a subscriber as owing to the heavy draw on the battery it is not desirable to have the vibrator in motion all of the time. This arrangement might of course be attached in the switchboard so as to obviate the necessity of the key, but as this is suggested merely in the nature of a 'tide over' we will not enter into details.

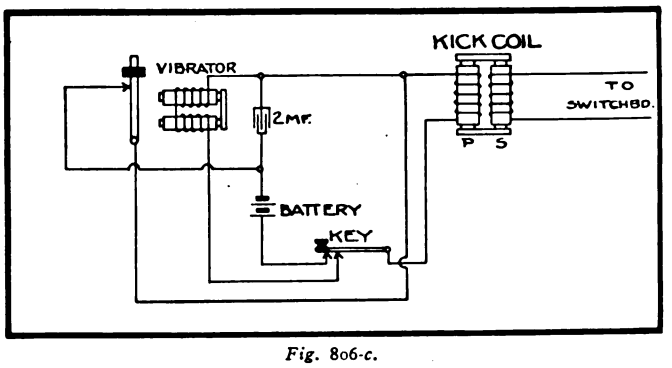

Fig. 806-*c.*

"With a few more dry cells inserted it might also prove a good thing to attach to your neighbor's cat or the salesman who sold you the instruments, on his next visit to you."

This is an unusually vigorous expression of opinion. The kick coil telephone must have made a powerful impression on some other reader, and we hope to receive information which will bring out some new points, from men familiar with the instrument.

REMARKABLE DEVELOPMENT OF TELEPHONE MANUFACTURES INDICATED IN LATEST CENSUS REPORT.

BULLETIN No. 57 issued by the United States Census Bureau contains a table which shows the values of products of manufacturers of electrical machinery, apparatus and supplies for the years 1905 and 1900. It is extremely interesting to note that the value of the telephone apparatus produced in 1905 was $15,863,698, as against $10,512,412 for 1900.

In 1905 the only classes of material which exceeded in value the telephone apparatus were the items of insulated wires and cables with the valuation of $34,519,699, and motors of all kinds with a valuation of $22,370,626. The total value of electrical products of all classes is $159,551,402, so that the telephone apparatus according to the strictest classification is equal in value to more than 10 per cent. of the entire product of manufacturers of apparatus for all electrical industries.

These figures do not admit of a direct comparison of the amount of material used by operating telephone companies and those in other branches of the electrical industry, as the telephone companies are large users of dynamos, motors, batteries, insulated wires and cables, electric conduits, electrical measuring instruments, fuses and lightning arresters, and other material included in separate classifications.

The growth of the industry seems to be hardly indicated with accuracy by a comparison with the figures for 1900, as it is well known that the growth of manufacturing establishments during the past five years has been very far in advance of the ratio between the valuations given.

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TELEPHONE PATENTS

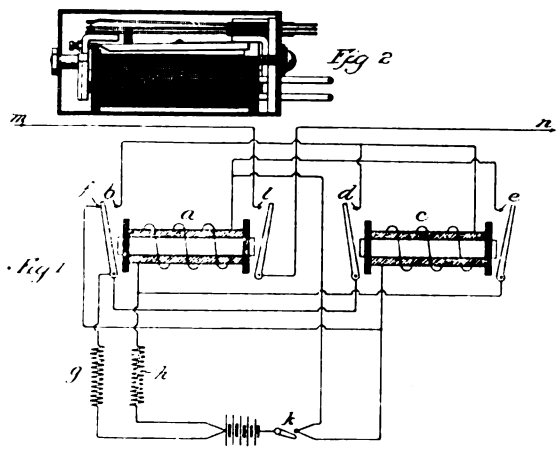
ELECTRICAL CIRCUIT INTERRUPTER.

Albert M. Bullard and William H. Matthies, New York, N. Y., patents (No. 838,005, dated Dec. 11, 1906; filed Sept. 9, 1905; serial No. 277,713) an interrupter.

This circuit interrupter was designed especially for use in connection with the busy tone circuit commonly used on the Bell automatic switchboards for small exchanges. It is stated that the busy tone is more readily distinguished if it be intermittent or throbbing in character than a continuous hum, which more closely resembles noise from electric light induction. This new interrupter operates on the principle of utilizing electromagnetic inertia, produced primarily by a heavy closed copper secondary encircling the iron core of a relay.

The circuits of the two relays forming an interrupter, as shown in the illustration, are so designed that they alternately short circuit each other's winding, thus producing a slow reciprocating movement of each armature, which is utilized to make and break at regular intervals the busy tone circuit leading to the switchboard.

It will be evident that when the battery circuit is closed, relay *a* operates its front contact *b*, and thus closes the circuit through relay *c*, which attracts its armatures. In so doing it closes contact *d*, which causes relay *c* to remain locked up independent of contact *b* or relay *a*. Contact *e* of relay *c* short circuits relay *a*, which thereupon releases its armatures and its back contact, *f*, in turn, short circuits relay *c*. Relay *c* thereupon releases its armatures, regardless of the locking circuit closed at contact *d*. The opening of contact *e* allows relay *a* to operate, thus beginning a second circuit, identical with the first. The cycles follow each other regularly and with a frequency which is kept from becoming too great by the sluggishness of the copper jacketed relays, and also by the short circuiting method of de-energizing the respective relays. This effect is assisted by the plan of causing the second relay, *c*, to lock up its armature, there-



by permitting the armature of relay *a* to fully recover before current is diverted from relay *c*.

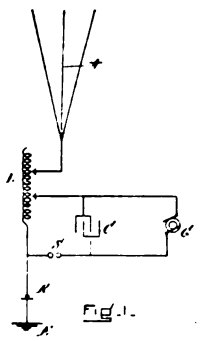
A still further reduction of the speed of armature movement for relay *c* is due to resistance coil *g*, which tends to slow down the movement by reducing the amount of current available for operating this relay. Another effect of this resistance is to prevent the short circuiting of battery when contact *f* is closed; resistance *h* prevents short circuiting when contact *e* is closed by relay *c*.

This device is self-starting automatically upon the closure of switch *k*, and the inventor states that it has been found in practice to possess the advantage of working reliably at all temperatures. Its sole function is to intermittently open and close in definite periods the interrupter circuit extending from *m* to *n*, at the contact *l*.

WIRELESS TELEPHONE TRANSMITTER.

Lee De Forest, New York, N. Y., patents (No. 836,072; dated November 13th, 1906; filed December 11th, 1905; serial No. 291,222; divided and this application filed December 22d, 1905; serial No. 292,922) a wireless telephone transmitter.

This patent covers a combination of apparatus, the arrange-



ment of which is substantially indicated in the accompanying circuit diagram. The oscillating circuit *C S L* is intended to be energized by the alternating current generator *G*, either directly or through a transformer. This generator should produce a current at a frequency of at least 750 cycles per second, and preferably as high as can conveniently and commercially be produced. By means of the adjustable connections of the oscillating circuit and antenna, *A* with the inductance *L*, the natural periods of the antenna and the oscillating circuit may be brought into agreement. *K* is a variable resistance device, such as a microphone transmitter, adapted to be controlled by sound vibrations. This is used to vary the amplitude of electrical oscillations produced by the continuously operating train of sparks at the gap *S*, which have a frequency higher than the frequency of the more essential vibrations accompanying speech.

AERIAL CABLE SUPPORT.

Charles L. Brown, Philadelphia, Pa., patents (No. 837,185; dated November 27th, 1906; filed July 21st, 1905; serial No. 270,706) an aerial cable support.

The object of this invention is to provide a support for cables which will automatically clutch the messenger strand, and be attachable without the use of any clamping tool. In the described form the hanger is made of a single piece of wire, bent in the middle to form a loop through which the cable may be drawn. The ends of the wire pass upwards side by side, and are then bent at right angles in such a way as to pass up on the same side of the messenger wire, and extend in opposite directions along its top. The ends are further bent over so as to engage the messenger as hooks, and be firmly gripped upon it when tension is applied, due to the weight of the cable.

TELEPHONE METER.

Newman H. Holland, Brookline, Mass., patents (No. 838,115,

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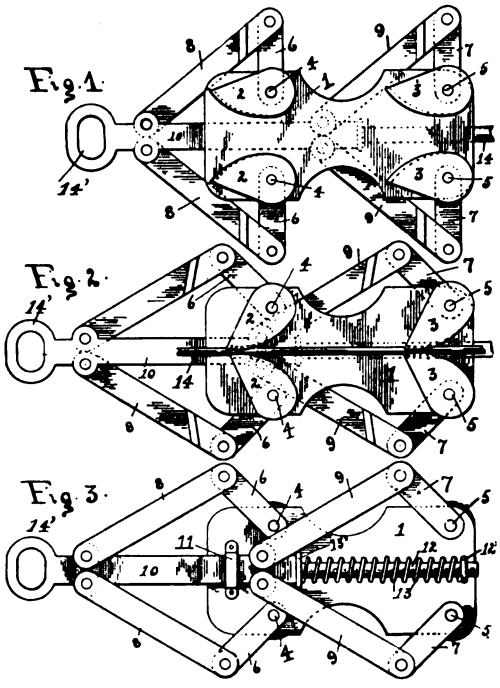
dated Dec. 11, 1906; filed Jan. 31, 1902; serial No. 92,053) a telephone meter.

This patent covers a combination of a recording instrument with a circuit controlling mechanism arranged to perform the following functions: When the subscriber calls at the central office a contact in his transmitter circuit is automatically opened and retained in this position until he actuates the registering train of the meter. In order to prevent the opening of this contact on an incoming call, means are provided for closing the transmitter circuit automatically upon the receipt of signaling current from the central office. An auxiliary device maintains the transmitter circuit closed for a sufficient time to give the subscriber an opportunity to give details of his call to the operator, but not long enough to allow him to carry on a conversation with a second subscriber. Circuits for above mechanism in both magneto and common battery systems are given.

WIRE TIGHTENER.

Emanuel P. Dubrule, San Francisco, Cal., patents (No. 837,549, dated Dec. 4, 1906; filed Aug. 29, 1906; serial No. 332,520) a wire tightener.

Upon the upper face of supporting plate, 1, are pivoted two pairs of eccentric gripping jaws, 2 and 3. The pivot studs, 4, 5, for these pairs of jaws extend through the supporting plate and are rigidly connected to toggle members 6, 7. The free ends of these toggle members are articulated in turn to toggle members 8, 9, which are pivoted to rod 10. This rod, 10, works within guides 11, 12. A spring, 13, holds rod 10 in a position to keep the gripping jaws closed. A wire may be inserted by simply forcing rod 10 toward plate 1 against the tension of the spring. When the wire has been gripped it will be firmly held, owing to



the tension of the spring, and as further tension is applied in the shape of a pull on rod 10 by a cable attached to ring 14^1, the wire 14 is gripped still more firmly, owing to the eccentric mounting of the jaws.

TELEPHONE ATTACHMENT.

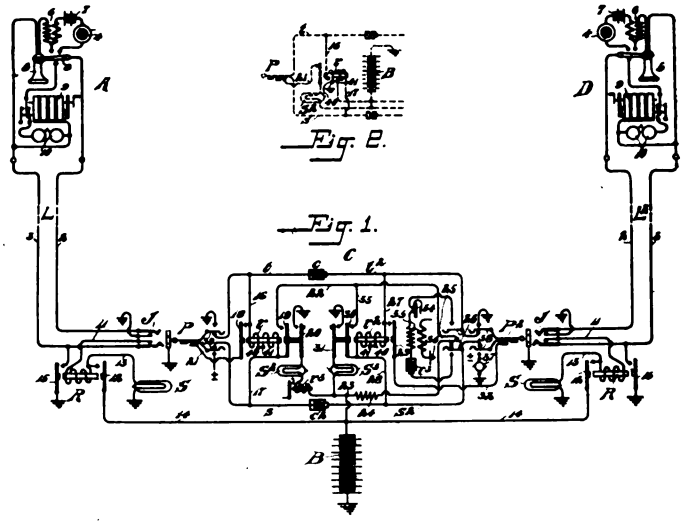
Bradley L. Stone and George M. Dressel, Belpre, Ohio, patent (No. 835,119, dated November 6, 1906; filed March 12, 1906; serial No. 305, 674) a telephone attachment.

This comprises an attachment for a call bell to notify a subscriber of the receipt of a call during his absence. This is particularly useful in places where two or more bells are mounted in the same room. An adjustable case, which may be fastened to the face of the call box by screws, holds the mechanism. Through the top of the case projects a pivoted slotted member adapted to engage with the bell hammer. The opposite end of this pivoted member, which is free to move with the vibrations of the hammer, is provided with a terminal enlargement in which are cut slots adapted to receive a locking pin of a movable drop. This drop is free to slide vertically in grooves when the locking pin is released. The motion of the hammer is intended to vibrate the pivoted member and when the locking pin of the annunciator is opposite a slot at the base of a groove in the movable member the annunciator falls through an opening in the bottom of the case. It may be restored by hand.

TELEPHONE CORD CIRCUIT.

Albion D. T. Libby, Chicago, Ill., patents (No. 836,514, dated Nov. 20, 1906; filed Sept. 3, 1904; serial No. 223,200) a telephone cord circuit.

In this patent the inventor describes a method of obtaining a



clearing-out signal in a lamp signal magneto switchboard by the use of a special relay which allows the system to be easily changed over to common battery, if desired.

As shown in the illustration, the supervisory relay r is bridged between strands s and t of the cord circuit. After a connection has been made, if a subscriber, as A, gives the clearing-out signal by operating his hand-generator, current will flow through the bridge relay r and operate it. When its contacts are closed, current from battery B takes a course from the negative pole through point 23, conductor 24, to spring 19, the winding of the relay, spring 18, and conductor 21 to ground attached to the sleeve of jack J. This current locks the relay and maintains the illumination of the supervisory lamp S^3 and holds up the armature of the pilot relay r^3. A shunt path for generator current due to a possible subsequent ring is furnished through springs 18 and 19, as follows: assuming the generator current to have been flowing over the conductor current 16 toward relay r, it passes through 18 and 21 to ground, thence through battery B to 23, over conductor 22, containing resistance 24 and contacts 25, to spring 19, conductor 17 and out over the ring side of the telephone line, this path being of less resistance and retardation than that of relay r. Relay r^3 is controlled by subscriber D in a similar manner. Condensers c and c^3 are of a capacity low enough to obstruct alternating currents of ringing frequency so as to prevent the operation of supervisory relay at the remote end of the cord circuit; but their capacity is high enough to allow a free passage of high frequency voice currents. Should relays r and r^3 become operated in the act of plugging in they are de-energized on the opening of contact 25 when the listening key is operated.

It may be seen that in the above arrangement the locking circuit and simultaneous shunting of the relay for alternating currents is designed to prevent the clearing-out signal from being tripped by a wave of the hand generator at the sub-station in opposition to the common battery current flowing through the locking winding. Two separate windings brought out to points 40 and 41 provide for transforming the circuit into one having common battery supervision, as shown in Fig. 2.

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GRAY PAY STATIONS PAY

BECAUSE NO ATTENTION IS REQUIRED AFTER INSTALLED

You are instructed not to shout in a telephone, as you can hear better by talking in a natural, distinct voice.

The same rule applies to our perfect system of signals—they are clear and distinct to the operator and not confusing like lever blows of hammers.

GRAY TEL. PAY STATION CO. HARTFORD, CONN.

WANTED

For "Help" and "Positions Wanted" advertisements only. One cent per word for each insertion. Minimum charge 25 cents. Prepaid.

POSITION WANTED—As Assistant Manager or Superintendent of telephone exchange of two to eight hundred subscribers. Six years' experience, good habits and can give best of reference. Address Box 717, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 717

WANTED—By Bell company operating just outside of New York City, two competent general foremen. Must understand heavy toll line construction and interior block work. Address Box 746, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 746

WANTED—Well educated young man, good appearance and references with some telephone experience. Write fully. Address Box 727, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 727

POSITION WANTED—A practical telephone construction and equipment man, with twenty-five years' experience with one of the largest operating companies in the United States, desires position as assistant engineer or superintendent of equipment. The advertiser is holding a similar position at present, but wishes to enter the service of a company where he will have more extended opportunity. Thoroughly experienced in every branch of the business. Address Box 740, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 740

WANTED—Position as Manager or Superintendent of telephone plant, salary must be not less than $100. Most any locality satisfactory. Twelve years experience with Bell company, 30 years of age. Address Box 750, care AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 750

WANTED---Continued

WANTED—Position as manager or assistant by thoroughly competent construction man and executive. Gilt edge references. Address Box 743, care THE AMERICAN TELEPHONE JOURNAL, 100 William street, New York. 743

WANTED—Telephone solicitor. State experience and references. Address, People's Telephone Co., Superior, Wis. 748

WANTED—An all-around man to take charge of magneto system of 375 subscribers in town of 3,000 inhabitants. Must understand switchboard work thoroughly. Married man preferred. Address, Ogle County Telephone Co., Rochelle, Ill. 749

SUBSCRIBER'S LEASE AND TOLL LEDGERS

Write To-Day For Samples and Prices. Toll Bills. Rental Bills

Form G-90.	For Small or Branch Exchange use; carries account for 2 years.
Form G-90-A.	For Large and Medium City Exchanges and Systems of Exchanges; the most complete form made.
Form G-90-B.	For City Exchanges having many Rural Lines.
Form G-90-C.	For City Exchanges, Rentals and Toll Charges separated.
Form G-90-E.	For Small Exchanges, Rentals only.
Form G-90-F.	For Small Exchanges, Tolls only.
Form G-90-G.	One subscriber to a sheet; carries account 4 years.
Form G-90-H.	One subscriber to a sheet; carries account 12 years.
Form G-90-I.	For Small Exchanges; Bound Books; carry 12 subscribers on a page for 1 year.

THE Edwards-Hine Co.

TELEPHONE SYSTEMATIZING DEPT.
5 and 7 PEARL STREET (EAST), GRAND RAPIDS, MICH., U. S. A.

GENERAL STORAGE BATTERY CO
BIJUR
"HIGH DUTY"
90
NEW YORK

A Square Deal

YOUR INQUIRY IS OF VALUE TO US
OUR INFORMATION IS OF VALUE TO YOU

Write for Catalogue A to

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New York

GENERAL STORAGE BATTERY CO

Works
BOONTON
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IN THE MANUFACTURING FIELD

"SUCCESS LIES IN THE KNOWLEDGE OF OUR TOOLS"

SPECIAL DAYS AT CHICAGO ELECTRICAL SHOW.

MANAGING DIRECTOR NIESZ announces the following special days for the January Electrical Show at the Coliseum: Formal opening (invitation), Monday evening, January 14; Northwestern Electrical Association's annual meeting, Wednesday, Thursday and Friday, January 16, 17 and 18; Ben Franklin day (souvenirs), Thursday, January 17; Illuminating Engineers' Society, Friday, January 18; Telephone Day, Monday, January 21; Sons of Jove, Tuesday, January 22; Thomas A. Edison Day (souvenirs), Wednesday, January 23; Electrical Salesmen's Association, Thursday, January 24.

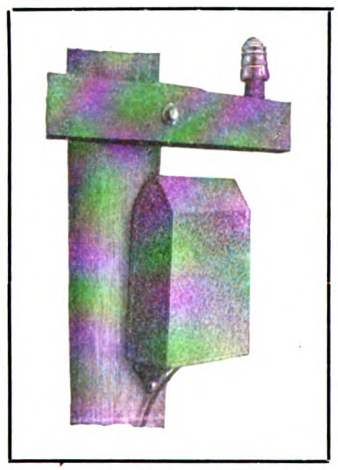
The new storage battery which Thomas A. Edison has just completed, and which promises to revolutionize the problem of transportation, will probably be exhibited and demonstrated for the first time. Mr. Edison has been invited to attend the exposition and has intimated that he will probably accept the invitation. If he comes, a special program and banquet will be arranged for Edison day.

The management announces an "Electric Midway" as one of the features for the coming show. For this the main floor of the Coliseum annex will be divided into four small theatres. One of these will be devoted to new demonstrations with static apparatus and high and low frequency current, showing many new and wonderful inventions along these lines and some marvelous results. Another theatre will have a new electrical and mechanical creation called the "Aurora Borealis," which will show some beautiful lighting effects, invented and arranged by Edgar Healey, of Chicago. In the third theatre will be an electrical musical act.

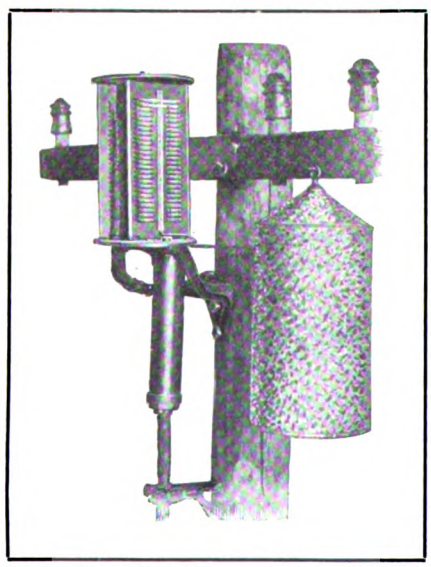
Thirty thousand square feet of space have been sold for general exhibits on the main floor of the Coliseum, but four spaces remaining unsold. Encouraged by the interest the trade and the public took in last year's show, the exhibitors, as a whole, have this year put more money and effort in the arrangement and installation of their displays. Everything that is new in the electrical world will be found, the 200 concerns represented completely covering the electrical field.

NEW TYPE OF CAN TOP TERMINALS.

FOR the protection of cables a new type of can top terminals has recently been put on the market by the F. Bissell Co., of Toledo, O. As will be seen in the accompanying illustrations, the cans are put up in two styles, one being square and the other round. The smaller of the two styles is for five and ten-pair capacity, and is particularly desirable in multiple cable work, while the larger can top, having a capacity for fifteen pairs and over, has a very wide field in all forms of distribution.



New "Security" Can Top Terminal, in Small Size, Especially Adapted to Multiple Distribution.



Larger Size of New "Security" Cable Terminal.

The cases in both types are made of heavy galvanized iron, while the panels are practically the same as the well-known "Security" panel that has been on the market so long. Special effort has been made to prevent the condensation of moisture on the distributing panel on the inside, thus decreasing the probability of cross-talk or sputtering.

The Bissell people lay claim to many points of superiority over the old type pole houses, some of the main points of superiority claimed for the new can tops being compactness, convenience, lightness, accessibility, price and low rate of depreciation. The entire outfit is very compact, substantial and neat in appearance.

The first tops have now been in use a sufficient length of time to permit of a fair test in actual practice. Very satisfactory reports have been received by the manufacturers. It is believed that these terminals will be a valuable addition to the well-known line of "Security" construction specialties, and preparations for turning them out in large quantities are being made. The company will send further information to interested persons who ask for it.

T. J. COPE, 3244 N. 15th St., Philadelphia, Pa., has prepared a booklet which shows methods of using a number of patented devices for underground construction which he manufactures and sells. These represent the highest grade of material and design, on thoroughly practical lines. Mr. Cope will be pleased to send this booklet and any further information desired to all interested persons.

THE COMMERCIAL ELECTRICAL SUPPLY COMPANY, corner 15th and Pine Sts., St. Louis, Mo., has recently prepared a large catalogue for its customers in Spanish speaking nations. This book gives an exceptionally complete list of material, and is exceedingly well illustrated. All information is printed in Spanish, and the book will be cheerfully sent, without cost, to interested persons.

NEW SUPPLY HOUSE IN TEXAS.

THE Central Telephone & Electric Co., St. Louis, Mo., after repeated requests for a nearer supply point from which to make shipments to its large and growing list of customers in the Empire of the Southwest, has met this demand by the organization of the Central Telephone & Electric Company of Texas. This concern will commence business at Dallas, Texas, January 1st. Its business will be in charge of Mr. Royal Smith, well known to the telephone operating trade in the Southwest, and Mr. George F. Poertner, who has successfully traveled in that section for the St. Louis house.

The Central Telephone & Electric Company of Texas will carry in stock at Dallas not only a complete line of the well known "Central" telephone apparatus for both magneto and central energy exchanges and rural line, hotel and intercommunicating installations, but a complete stock of all standard telephone construction materials, maintenance supplies, tools, etc. Its buying facilities and mill connections are such that it will be enabled to quote attractive prices, and from the many expressions already received, it will no doubt meet with success from the start.

Carloads of goods have already gone forward, and inquiries or orders addressed to the Dallas office will receive prompt attention from the managers of the new house.

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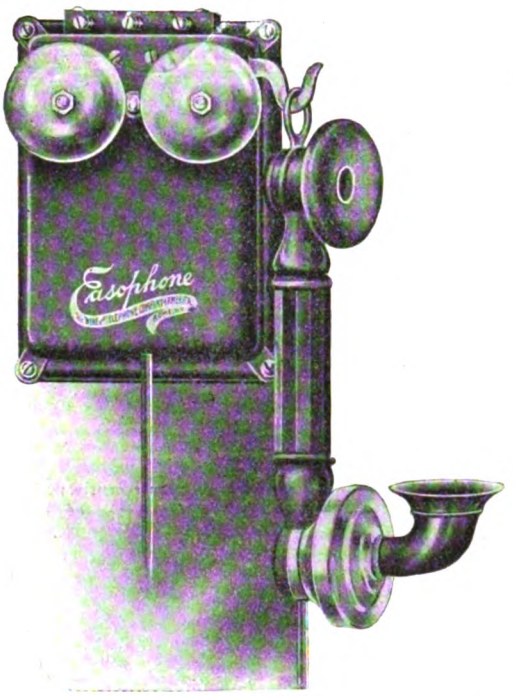


Easophones
The WIRE and TELEPHONE COMPANY of AMERICA
ROME, N.Y.

Long Distance Hand Telephone
Long Horseshoe Magnet Receiver

SOLID BACK TRANSMITTER
NO EXPOSED CONNECTIONS
SINGLE COIL RINGER
REVERSIBLE HOOK

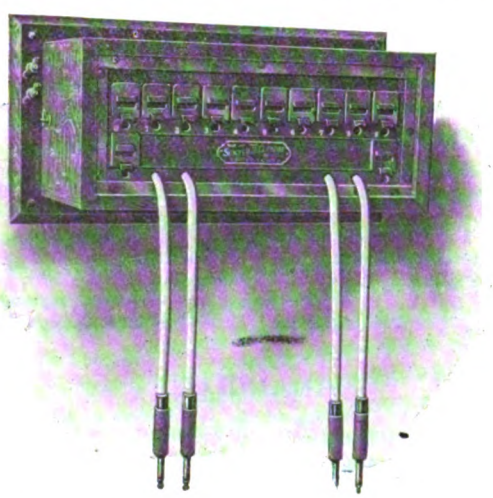
EXPOSED BELL ADJUSTMENT
INDESTRUCTIBILITY

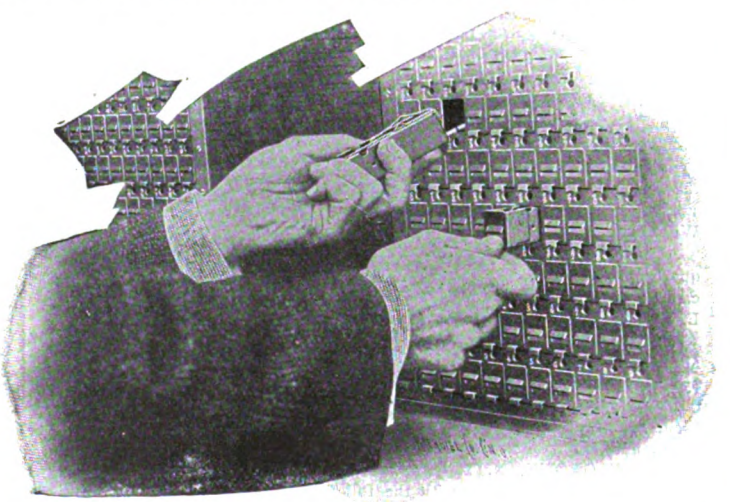
WRITE FOR BULLETIN No. 101

THE WIRE & TELEPHONE COMPANY OF AMERICA
ROME, N. Y.

SMALL SWITCHBOARDS

Instant Interchangeability. Do You Realize What It Means?





Standard parts, simple in construction and operation

Each drop can be removed with the hands alone, no screws, solder or pins, just pull them out!!!

Get our Bulletin 40X.

The Sumter Tel. Mfg. Co., Sumter, S. C.

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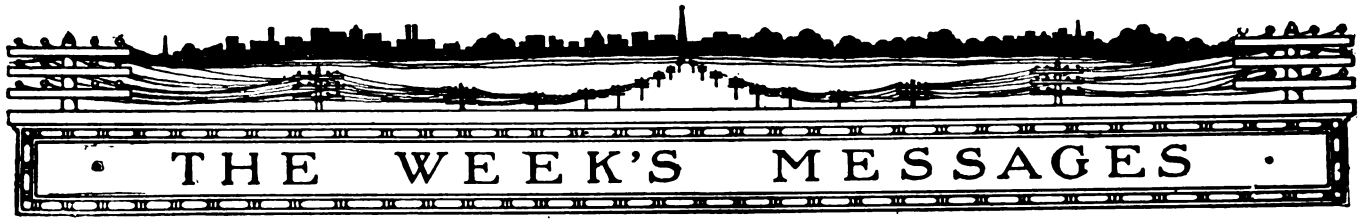

NEW COMPANIES.

GAINESVILLE, GA.—The Wooleys Ford Farmers' Telephone Company has been organized with A. J. Julian as president, and J. M. McClure as secretary.

ADDIEVILLE, ILL.—Articles of incorporation have been filed by the Addieville Mutual Telephone Company. It has an authorized capital stock of $735.00, and the incorporators are William Grattendick, C. Thoms and John Meyers.

CLAYTON, ILL.—The Clayton Farmers' Mutual Telephone Company, of Clayton, has been incorporated with a capital stock of $800. The incorporators are C. Lewis, R. L. Bauton and William Meatheringham.

COOKS MILLS, ILL.—An Independent telephone company is being formed by the farmers northwest of Cooks Mills. Those interested in the new enterprise are Gifford Clark, Fred Hunt, W. E. Clark, J. W. Wright and Frank Ellison. It is the intention of the company to build lines to Arthur.

GREEN RIVER, ILL.—The Green River Telephone Company has been organized, and the construction of its lines will probably be commenced at once.

WALKER, IA.—A new Independent telephone company, to be known as the Farmers' Mutual Telephone Company, has been organized at Walker, and application filed for a franchise to operate in Walker.

MILTONVALE, KAN.—The County Line Telephone Company has been organized at Miltonvale, and the system will be constructed at an early date.

INDIAN BOTTOM, KY.—The Lewis Telephone Company, of Indian Bottom, has been incorporated. It is the intention to build lines from Cornettsville, Perry County, to Whitesburg, Letcher County, and up Rock House Creek to Colston, Letcher County. The company has a capital stock of $1,500, and the incorporators are T. G. Lewis, J. H. Brown and Jeff Ison.

PALMYRA, KY.—The Farmers' Metropolitan Telephone Company, with headquarters at Palmyra, has been organized, and has selected the following officers and directors: President, Clarence Quibberman; secretary, James Rector; treasurer, Fred Haub; directors, A. N. Wolfe and Samuel Hendricks. The company contemplates the erection of lines in Floyd, Clark, Washington, Harrison, Crawford and Orange counties, at which places exchanges will be established.

FAIRMONT, MINN.—The farmers in the vicinity of Iowa Lake have organized a farmers' telephone company, which is to be known as the Iowa Lake Telephone Company. The officers are as follows: President, C. W. Watts; vice-president, Wm. Simpson; clerk, R. R. Livingston; treasurer, E. J. Edwards; directors, P. H. Fealey and G. L. Comstock. The lines will start at Iowa Lake and connect with Fairmont.

SEDALIA, MO.—An Independent telephone company, to be known as the Sedalia, Warsaw & Southwestern Telephone Company, with a capital stock of $5,000, is being organized at Sedalia. It is its intention to establish exchanges at Warsaw, Lincoln and Cole Camp.

JERSEY CITY, N. J.—Articles of incorporation have been filed by the Diamond State Company, of Jersey City. The company will carry on, promote and maintain telephone and telegraph lines in New Jersey, Delaware, Pennsylvania and elsewhere. The capital stock is given at $5,000,000, and the incorporators are Charles Schlegle, Arthur Robertson, J. Valentine Forster and James Ross, of Jersey City, N. J., and W. L. Missmer, of Wilmington, Del.

ALAMOGORDO, N. M.—The Sacramento Telephone Company, with headquarters at Alamogordo, has filed articles of incorporation. The company's capital stock is given as $10,000, of which $2,000 has been paid in, and J. L. Lawson, of Alamogordo, is among those interested in the new enterprise.

MACHIAS, N. Y.—Articles of incorporation have been filed by the Machias Telephone & Electric Company. The capital stock is placed at $5,000, and the company expects to construct and maintain lines in Cattaraugus County. The following directors have been elected: Myron B. Field, Clarence King, Glenn B. House, D. W. Evans, E. F. Cobb, E. G. Smith and W. S. Pierce, of Machias.

MAPLE GROVE, N. Y.—An Independent telephone company has been organized at Maple Grove, with the following officers and directors: President, A. H. Willson; vice-president, M. A. Platt; secretary, C. E. Pittsley; treasurer, H. A. Starr; directors, A. H. Tillson, Wm. Barber and F. E. Pittsley.

COOPERSTOWN, N. D.—The Griggs County Telephone Company, with a capital stock of $50,000, has filed articles of incorporation. Among the incorporators are David Bartlett, Geo. H. Condy and H. F. Hammer, of Cooperstown.

WILLIAMSFIELD, O.—The Williamsfield Telephone Company has been incorporated with a capital stock of $3,000. Among the incorporators are C. W. Towngle, A. H. Loomis, F. E. Palmer, T. W. Kiddle and C. A. Porter.

KIBBY, OKLA.—Plans for the organization of an Independent telephone company, whose intention it is to build a line to Supply, are under consideration at Kibby.

OKLAHOMA CITY, OKLA.—Articles of incorporation have been filed by the Edwards Telephone Company, of Oklahoma City. It has an authorized capital stock of $300,000, and the directors are Duncan G. Smith, J. R. Keaton and M. R. Smith, of Oklahoma City, and J. E. Wolbright and W. T. Perkins, of Quannah.

PERRY, OKLA.—Articles of incorporation have been filed by the Warren Valley Telephone Company. It has a capital stock of $1,000, and the incorporators are G. D. Michael, of Lincoln; Fred Kukuk and W. J. Burke, of Perry.

HARRISBURG, PA.—The American Union Telephone Company, a consolidation of Independent telephone companies in Pennsylvania, Southern New York, Maryland, Virginia and West Virginia, was recently permanently organized, and the following officers elected: Ellis Orvis, of Bellefonte, president; B. F. Myers, of Harrisburg, vice-president; S. R. Caldwell, secretary and treasurer; Lyman D. Gilbert, general solicitor; F. D. Houck, Harrisburg, general manager.

HARRISVILLE, PA.—A charter will be applied for by W. A. McMillen, J. J. Imbrie and J. G. Buchanan for the Harrisville Telephone Company. It is their intention to erect, construct and operate telephone lines in Butler, Venango and Mercer counties. This company will be formed for the purpose of connecting with rural lines running out of Mercer, and to connect with the system at Slippery Rock.

MILWAUKEE, WIS.—The Milwaukee Independent Telephone Company has filed articles of incorporation at Madison for a long distance telephone company which will connect the new Milwaukee system with Independent telephone lines in the State. The capitalization is at present a nominal one, $25,000, and the incorporators are H. D. Critchfield, Richard Valentine and C. J. Chapin.

CALEDONIA, ONT., CAN.—Meetings are being held by the citizens of Caledonia with the object of organizing an Independent telephone company to operate in Caledonia and the surrounding country. There seems to be but little doubt that the organization will be perfected at an early date.

WATERFORD, ONT., CAN.—An Independent telephone company, to be known as the Norfolk County Telephone Company, Ltd., has been incorporated with a capital stock of $40,000. Its principal place of business will be at Waterford.

FRANCHISES.

BENTON HARBOR, MICH.—The Lake Shore Telephone Company has been granted a franchise to install a telephone system at Benton Harbor, Mich., to operate in competition with the Bell Company.

BATH, N. Y.—Application has been made by the Steuben County Telephone Company to build additional lines in Bath.

GRAND FORKS, N. D.—The franchise of the Tri-State Telephone Company, to operate in Grand Forks, is to be taken up by the city council.

WESTON, OREGON.—The various rural telephone companies centering at Weston have joined in a petition to the city council for a franchise for ten years rights of way.

LONDON, ONT., CAN.—The Independent Long Distance Telephone Company of Ontario has applied for a twenty-five year franchise at London, Ont. The company was organized at the request of many Independent Ontario companies for the purpose of giving them connection with one another, and it is to operate in competition with the Bell company. It is its intention to construct lines from Fort Erie to Windsor and to Toronto.

PORT HOPE, ONT., CAN.—A telephone franchise has been granted to G. W. Jones and W. H. Burley, of Newtonville, Ont., representing the Rural Farmers' Telephone Association, which has lines through Clarke and Hope townships.

FINANCIAL.

HARDY, ARK.—At a meeting of the stockholders of the Spring River Telephone Company, held at Hardy, a dividend of 10 per cent was declared, and the following new officers elected: Walter Clayton, president; C. C. Price, secretary and general manager; A. M. Metcalf, treasurer.

MIDDLETON, IDAHO.—The Star Independent Telephone Company, of Middleton, Idaho, has declared a 12 per cent. dividend.

TRENTON, N. J.—The Citizens' Local Telephone Company has increased its capital stock from $10,000 to $125,000.

ALBANY, N. Y.—A dividend for the January quarter of one per cent., payable January 20th, to stockholders of record on January 10th, has been declared by the Albany Home Telephone Company.

HAMILTON, O.—The directors of the Hamilton Home Telephone Company authorized the sale of $30,000 of its preferred 6 per cent stock, and the entire issue was taken at once.

TOLEDO, O.—At a recent meeting of the directors of the United States Telephone Company a resolution was passed to declare a 1½ per cent

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CHEAP VS. EFFICIENT SERVICE

The cheapest telephone service in the world is dear at any price if it is not efficient.

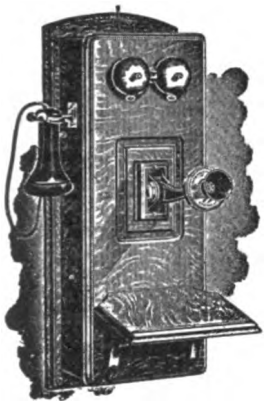
When a man installs a telephone he wants to be able to use it and not to abuse it.

A grounded line nine times out of ten is noisy, and foreign noise on a telephone line will arouse a feeling of anger in the heart of the user that isn't good for the company. You can keep your lines free from grounds and other troubles by periodic tests with a Pignolet voltmeter, and when they do occur, you can locate them with this instrument, and get them cleared often before the subscriber knew his line was in trouble.

If you need your subscribers' good will, you need my voltmeter to get it.

LOUIS M. PIGNOLET, Originator of the Voltmeter Habit

78 CORTLANDT ST., N. Y.



Our Price is Right

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TELEPHONE MADE

with all connecting wires, binding posts and terminal screws fully concealed

To Prevent Trouble

and with no exposed metal parts in the circuit to

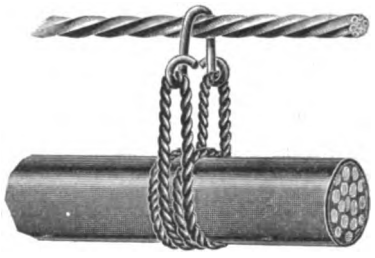
Avoid Danger

from lightning while using the instrument. Send us your inquiry and we will "SHOW-U" at our expense an interesting proposition.

INTERNATIONAL TEL. MFG. CO.

Harrison and Clinton Sts., Chicago

"National" Cable Hangers



Patent applied for

SIMPLE **DURABLE**

Cannot become detached from the messenger strand.

Hook will not straighten out.

Wires cannot be caught under the hook when being strung above the cable. We use the best grade of marline and houseline in the manufacture of our hangers. Write your jobber to-day for prices and samples.

National Telephone Supply Company

MANUFACTURERS

3923 Superior Avenue Cleveland, Ohio

MICHIGAN WHITE CEDAR POLES

In addition to the several yards we have had in the past, we wish to call your attention to our new yard which is located at Escanaba, Mich.

The acquisition of this new yard enables us to ship poles by all railroads or by the lake routes, thereby enabling us to give the best delivered prices.

The location of our new yard makes it easier to secure cars, thus facilitating prompt shipment.

In many cases poles can be shipped by car-ferry, making possible a great saving in cases of shipment to Eastern points.

We are wholesalers exclusively, shipping in car lots only.

Write us for delivered prices and "Pole Booklet No. 3-A." Yours for the asking.

KELLOGG SWITCHBOARD & SUPPLY CO.

CHICAGO, ILL.

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THE WEEK'S MESSAGES

dividend on the preferred stock of the company for the quarter ending December 31, 1906. The dividend will be payable January 10, 1907, to all stockholders on record January 4. At the same meeting a dividend of ¾ of 1 per cent was declared on the common stock, payable January 1, 1907, to all stockholders of record of December 24, 1906.

COMBINATIONS.

SEATTLE, WASH.—The Citizens' Telephone Company of Columbia City has been acquired by the Independent Telephone Company of Seattle. Many improvements are contemplated by the new owners, among which may be mentioned the stringing of a 100 line trunk cable to Columbia, and the building of a line to Renton.

ELECTIONS.

MIDDLETON, IDAHO.—The following officers and directors were elected by the Star Independent Telephone Company: J. S. Clark, president and general manager; L. B. Wehr, secretary; S. S. Foote, treasurer; Jacob Alchenberger, Jr., and Ray Blessenger, directors.

AURORA, ILL.—The Rural Telephone Company at a recent meeting elected the following officers and directors: E. R. Thomas, president; George Harrison, vice-president; William Halstead, secretary; O. A. Getchell, treasurer; Robert Attridge, O. A. Getchell and George Harrison, directors.

CAIRO, ILL.—The stockholders of the Thebes & Cairo Telephone Company have elected the following officers and directors: President, W. W. Wibourn, of Olive Branch; vice-president, John L. Bowers, of Willard; treasurer, C. E. Miller, of Willard; secretary, John S. Norman, of Thebes; directors, B. F. Brown, J. S. Norman, S. P. Spann, of Thebes; C. E. Miller, W. S. Cavender, J. L. Bowers, of Willard; W. P. Wibourn, Olive Branch; W. Paggett, Cache; C. O. Patier, of Cairo.

MONROEVILLE, IND.—The Monroeville Home Telephone Company has elected the following officers and directors: S. E. Mentzer, president; Jos. Clem, vice-president; G. E. Spake, secretary-treasurer; directors, S. E. Mentzer, G. E. Spake, J. Clem, J. E. Whitney and John Driver.

BOONE, IA.—The following officers have been elected by the Farmers' Co-operative Telephone Company, of Boone county; President, V. O. Holcomb; vice-president, Anton Nelson; secretary, Ed. Day; treasurer, A. Wills.

BOSTON, MASS.—The officers and directors of the Metropolitan Home Telephone Company, which was recently granted a franchise by the Aldermen of Boston, are: Warren N. Akers, president; Wesley M. Bishop, treasurer; directors, W. N. Akers, W. M. Bishop and Frank Grant.

READING, MICH.—At the annual meeting of the Reading Telephone Company, President Abbott and Secretary, Treasurer A. V. Henry were re-elected. The following directors were also elected: R. E. Bailey, Henry Shultz, O. E. Quackenbush, Elmer Van Sickle and Wm. Sell.

SUNNYSIDE, WASH.—The stockholders of Christian Co-operative Telephone Association have changed its name to the Yakima Valley Telephone Company, and the following trustees have been elected: W. B. Sawyer, H. M. Gilbert, J. L. Laughlin, of Zillah, and R. D. Young and A. C. Webber, of Sunnyside.

ELK MOUND, WIS.—The officers and directors of the Elk Mound Telephone Company are: J. C. Smith, president; O. J. Garton, secretary and treasurer. Directors: J. C. Smith, O. J. Garton, S. Repine, John Shannon, E. C. Mason, O. House and S. C. Langdell.

MISCELLANEOUS.

MARYSVILLE, KAN.—The Marysville Telephone Exchange has passed from the hands of W. W. Hutchison into those of Marysville capitalists, and James Morris, formerly connected with the exchange, has become superintendent of the company.

WASHINGTON, PA.—The franchise controlled by the Pittsburgh & Allegheny Telephone Company, of Pittsburgh, Pa., in Washington, has been transferred by President J. G. Splane to the State Mutual Telephone Company. It is the intention of the State Mutual Company to install a complete and up-to-date system at Washington, including an underground conduit plant. By means of this transfer the Mutual company is to be given direct connection with the Allegheny County trunk line system.

NACOGDOCHES, TEXAS.—The office of the South Texas Telephone Company at Nacogdoches, Texas, was completely destroyed by fire on Dec. 22. This is a 600-line central energy plant installed about four years ago. New equipment has been ordered and the company will soon be in operation again.

PERSONAL.

W. F. ATCHISON, of Terre Haute, Ind., has been reappointed manager of the Kinloch Telephone Company's exchange at Alton, Ill., a position which he held for some time before going to Terre Haute.

New Construction in the Field

RICHMOND, CAL.—It is the intention of the Independent telephone company at Richmond to install an entirely new system.

ROSEVILLE, CAL.—The Capital Telephone Company, of Sacramento, contemplates the establishment of a local exchange at Roseville.

DOUGLAS, ILL.—The Farmers' Telephone Company is extending its lines at Douglas.

PANA, ILL.—Many improvements are planned by the Christian County Telephone Company in its system at Pana.

PEKIN, ILL.—New lines are being built by the Union Telephone Company at Pekin.

QUINCY, ILL.—A toll line between Quincy and Clayton and Camp Point is being constructed by the Home Telephone Company.

RANSOM, ILL.—The lines of the Farmers' Mutual Telephone Company are being extended to take care of its increasing business.

ALBION, IND.—A new switchboard has been installed by the Noble County Telephone Company.

DUBUQUE, IA.—The Dubuque Telephone Company contemplates the erection of lines to every important point in the southern Wisconsin mining field. It already reaches Platteville, Cuba City, Hazel Green, Kieler and many other places.

FERTILE, IA.—The Lincoln Telephone Company is constructing a line to Fertile.

FORT DODGE, IA.—The lines of the Fort Dodge Telephone Company are being extended to take care of its increasing business.

MARENGO, IA.—A toll line from Marengo to Williamsburg has been erected by the Marengo Telephone Company.

GARDEN CITY, KAN.—It is the intention of the Great Bend Telephone Company to build a line from Great Bend to Garden City for the purpose of handling long distance calls to any part of the United States. The proposed line to Garden City provides for two circuits as far as Dodge City and one as far as Garden City.

ALMA, MICH.—Improvements are being made in the system of the Union Telephone Company at Alma.

HESPERIA, MICH.—Additional lines are being constructed by the Lake Shore Telephone Company at Hesperia.

EAGLE LAKE, MINN.—The Citizens' Telephone Company, of Mankato, is building an additional toll line to Eagle Lake to take care of its greatly increased business.

ELLSWORTH, MINN.—New lines are being built into Ellsworth by the Kanaranzi Mutual Telephone Company.

HUTCHINSON, MINN.—The Hutchinson Telephone Company has under consideration the construction of a number of new lines.

TRIUMPH, MINN.—It is the intention of the Mills County Telephone Company to construct and equip a complete metallic toll line service.

ALEXANDRIA, MO.—The lines of the Mississippi Valley Telephone Company are being extended from Alexandria to Gregory.

PAPILLION, NEB.—The Home Telephone Company expects to make many improvements in its system.

DOLGEVILLE, N. Y.—The Independent telephone company is at work on the improvements to its system in Dolgeville.

FRANKLINTON, N. Y.—The Pierce & Peaslee Telephone Company's lines have been extended to Franklinton.

FULTON, N. Y.—The Oswego County Home Telephone Company, which is now at work on its system in Fulton, expects to construct lines to Hannibal, Fair Haven, Oswego and Mexico at an early date.

SMYRNA, N. Y.—Many improvements are being made in the plant of the Sherburne Telephone Company at Smyrna.

ASHEVILLE, N. C.—The Asheville Telephone and Telegraph Company is building new lines in Asheville.

NEW BEDFORD, O.—The lines of the New Bedford Telephone Company are being extended to Stony Hill.

SHAWNEE, OKLA.—On account of the threatened raise in rates by the Bell telephone company at Shawnee, a private line belonging to the government is to be built from the Shawnee Indian Training School to the telegraph offices in the city.

WOODWARD, OKLA.—A new switchboard has been installed by the Home Telephone Company at Woodward.

BEDFORD, PA.—The Bedford County Telephone Company is making many improvements in its Schellsburg, New Paris and Pleasantville lines, and contemplates the erection of additional lines. It also expects to install a new switchboard at Fishertown.

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THE AMERICAN TELEPHONE JOURNAL

Vol. 14 NEW YORK—DECEMBER 29, 1906—CHICAGO Number 26

PUBLISHED WEEKLY ONE DOLLAR A YEAR

RUBBER COVERED WIRES AND CABLES

FOR ALL CLASSES OF HIGH-GRADE ELECTRICAL SERVICE

42 Broadway, New York.
211 Lake Street, Chicago.

NATIONAL INDIA RUBBER CO., BRISTOL, R.I.

WRITE US.

We make apparatus above the ordinary

LONG DISTANCE TELEPHONE MFG. CO.

Freight facilities unexcelled

South Bend, Indiana, U. S. A.

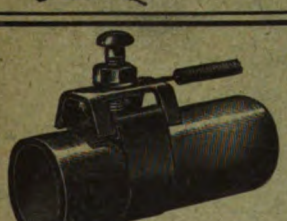
WATERBURY COMPANY
MAKERS OF LEAD COVERED PAPER AND RUBBER INSULATED CABLES
FOR TELEPHONE, TELEGRAPH AND POWER
ESTABLISHED 1816
OFFICE 69 SOUTH STREET, NEW YORK

Indiana Rubber and Insulated Wire Co. JONESBORO INDIANA

Manufacturers of

PARANITE RUBBER COVERED TELEPHONE WIRE AND CABLE

Write for Sample Card of Wire



New York Ground Clamp

For connecting telephone ground wires to pipes and cables. Cheaper than a wrapped connection; as good as a soldered connection. Adopted by nearly all the Bell Tel. Cos. and most of the larger Independent Tel. Cos. Samples free on application. Write for list of other specialties. **Yonkers Specialty Co., Yonkers, N. Y., U. S. A.** H. C. Roberts Electric Supply Co., Western Electric Co., Agents.

AMERICAN PROTECTORS *are right at the* FRONT ALWAYS

American Electric Fuse Co.

MUSKEGON, MICH.

Branch Office, 116 Nassau St., New York City

SIMPLEX

RUBBER INSULATED

TELEPHONE WIRES AND CABLES

846 MONADNOCK BLOCK CHICAGO — STANDARD ELECTRICAL WORKS SAN FRANCISCO

PROMPT ATTENTION TO SPECIAL REQUIREMENTS

THE SIMPLEX ELECTRICAL CO.

110 STATE STREET, BOSTON.

SHEET BRASS

ALL TEMPERS

BRASS & BRONZE—ROD & WIRE

GERMAN SILVER—TUBING, ETC.

CATALOGUE ON APPLICATION

THE PLUME AND ATWOOD MFG. CO.

NEW YORK-CHICAGO

PLATINUM RIVETS AND CONTACTS

GOLD MEDAL—Lewis & Clark Centennial Exposition, Portland, Oregon, 1905.

GRAND PRIZE—Universal Exposition, St. Louis, 1904.

Send for Literature

BAKER & CO., Inc. Newark, N. J.

N. Y. Office, 120 Liberty Street.

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The AMERICAN TELEPHONE JOURNAL

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BATTERIES WITH BRAINS

Not that Nungesser Batteries have brains, but that it takes brains to make them.

Brains trained through nineteen years' experience, studying the many problems of battery manufacture, give to the "1900" Dry Battery a superiority that is best attested by its extensive and ever-increasing use in all parts of the world where dry batteries are used.

If the name NUNGESSER is on your dry batteries you may be sure they are right, and yet it costs you no more to get this stamp of excellence and the good service that always goes with it.

Stromberg-Carlson Tel. Mfg. Co.

ROCHESTER, N. Y. CHICAGO, ILL.

¶ Now in the Lusty Winter Month of December, do I, The Blacksmith of Chicago, offer in open Mart, Good Tools and Iron Things for Poles. These have I wrought from Sound Iron nor cast a single one as is the custom of certain evil Smiths. ¶ In good sooth, if thou wouldst know more of this affair, do but let me know and a goodly scroll will be sent to thee with prices and if thou wilt with samples in good measure.

Hallett Iron Works

96 WEST POLK STREET

CHICAGO, ILL.

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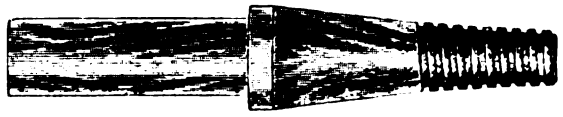
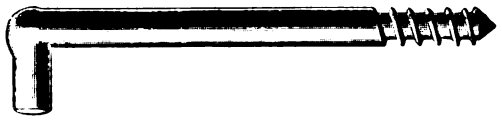
COMMERCIAL

Up Mr. Telephone Man,

Don't allow yourself to **behind**

the live ones but  **your faith**

to a STAR (not operatic, but supply house) and you

will be taking  **s in the right**

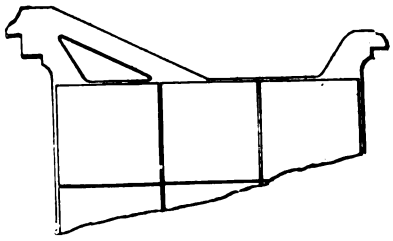
direction to save money.

COMMERCIAL

Five (5) car loads—Locust, Krecose and Oak Pins for Immediate Shipment

ALWAYS ASK "THE COMMERCIAL" WHEN IN A HURRY.

Commercial Electrical Supply Co., ST. LOUIS, MO.



A Double Conducting Lug

is provided for the Gould Battery Plate, securing a more even distribution of current to all parts of the plate than a single lug.

A small detail, but illustrative of the skill with which the Gould Plate is designed and constructed.

Write for our new booklet, "Gould Telephone Batteries."

SALES OFFICES
Boston—89 State St.
Chicago—Rookery Bldg.
San Francisco—Monadnock Building.
Toronto, Ont.—62 Wellington St., West.

Gould Storage Battery Co.

MAIN OFFICES
1 West 34th St.,
New York City.
Works, Depew, N. Y.

JUST A SUGGESTION

Take one of your busy 4-party lines and equip it with "POOLE" Lock-Outs. Leave it in service a month and then see how many of the four will stand a raise of $3.00 a year rather than go back to the old way. We know the answer, but we want your subscribers to impress on you the fact that the "POOLE" Lock-Out is a rate-raiser.

It won't cost you anything to try it, because we will loan you the Lock-Cuts free and there is no other equipment required. Write today for our Booklet AL-2.

Mountain State Electrical Company

WHEELING, W. VA.

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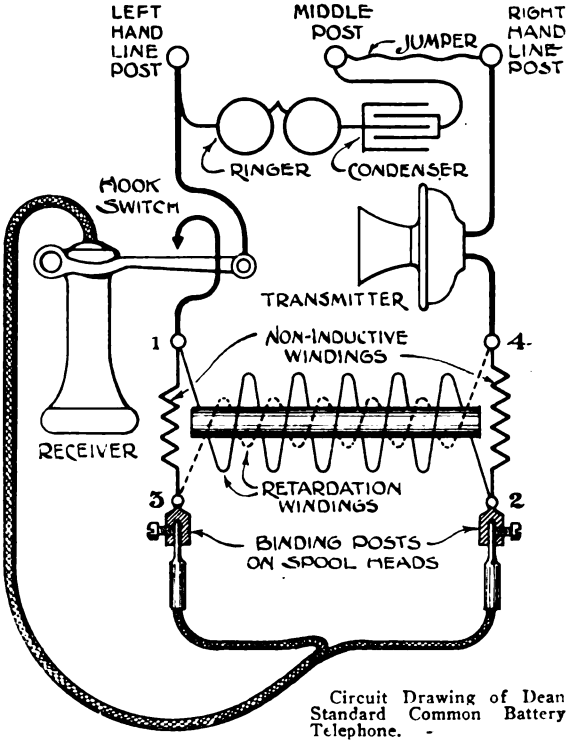
DEAN TELEPHONE APPARATUS

Metal Box Common Battery Wall Telephones



Circuit Drawing of Dean Standard Common Battery Telephone.

Dean Metal Box Common Battery Telephone.

In the accompanying illustrations we show our metal box telephone and standard common battery wall telephone circuit.

This telephone is fitted with the standard DEAN circuit and apparatus features, which at once stamp it as perfectly reliable and practicable. It is one of the most efficient and durable telephones made. It is made more substantial than the ordinary wood constructed telephone, while the transmission qualities are exactly the same. The retaining case is made from heavy sheet steel drawn into shape without seams and finished with a tough enamel, black being standard.

Some of the large operating companies are adopting this type of telephone exclusively.

Write for our bulletin, No. 102A, which gives full description and circuits of the efficient types of common battery telephones.

BRANCH OFFICES

Water Works Building
Kansas City, Mo.

542 Byrne Building
Los Angeles, Cal.

FACTORY AND GENERAL OFFICE
Elyria, Ohio

THE DEAN ELECTRIC COMPANY
ELYRIA · OHIO

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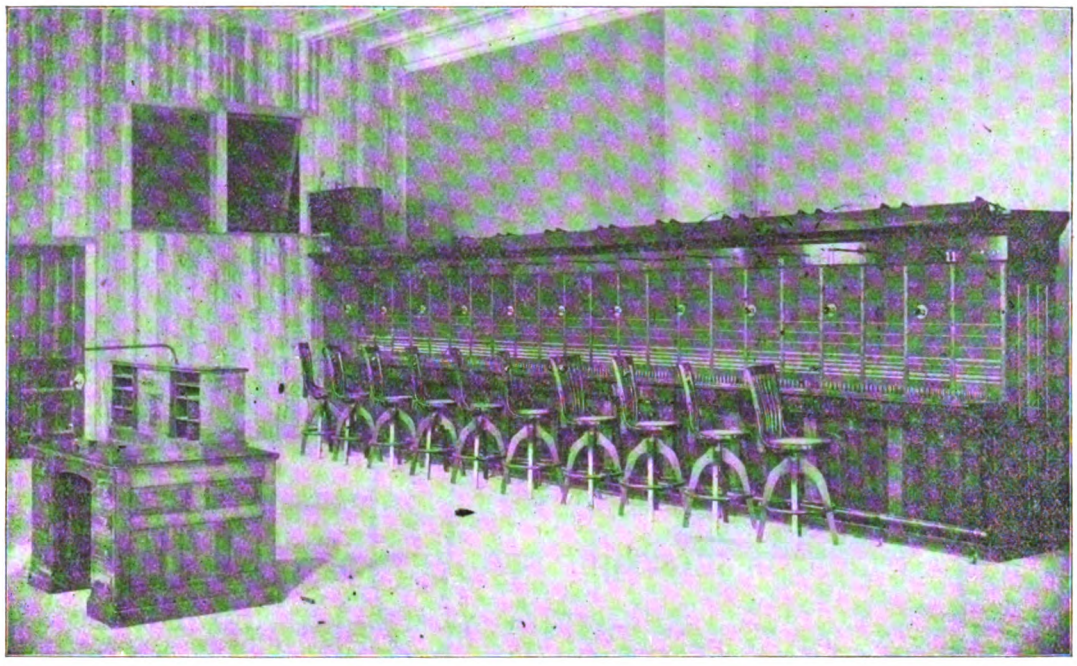

10 Position Common Battery Board

Simplest Circuit **Correct in every detail**

STERLING ELECTRIC CO., LAFAYETTE, IND.

MAKERS OF GOOD GOODS

You Wouldn't Start a Horse Car Line

in this age of electric cars? Not if you wanted to make money out of the business of transportation.

Then why should you start a manual telephone exchange in this age of automatics, if you want to make money out of the telephone business?

The automatic system of telephony bears the same relation to the manual system that the electric car does to the horse car. It is the apotheosis of telephone development, as the electric car is of transportation development.

The automatic telephone system produces the best service more economically than indifferent service can be produced with manual equipment.

There is no more question as to the relative popularity of the automatic and manual telephone service where the two kinds are in competition than there is as to the relative popularity of the trolley car and the horse car.

And, as for the securities—the same comparison may be applied with the same results.

Our Automatic system has been adopted in the following cities:

Aberdeen, S. D.	Clayton, Mo.	Jonesboro, Ark.	Ocean Park, Cal.	Springfield, Mo.
Akron, Ohio.	Cleburne, Texas.	Lake Benton, Minn.	Pentwater, Mich.	St. Marys, Ohio.
Albuquerque, N. M.	Columbus, Ga.	Lewiston, Me.	Portland, Me.	Tacoma, Wash.
Allentown, Pa.	Columbus, Ohio.	Lincoln, Neb.	Portland, Ore.	Toronto Jct., Can.
Auburn, Me.	Dayton, Ohio.	Los Angeles, Cal.	Princeton, N. J.	Traverse City, Mich.
Auburn, N. Y.	El Paso, Texas.	Manchester, Iowa.	Richmond, Ind.	Urbana, Ill.
Battle Creek, Mich.	Fall River, Mass.	Marianao, Cuba.	Riverside, Cal.	Van Wert, Ohio.
Bellingham, Wash.	Ferguson, Mo.	Marion, Ind.	San Diego, Cal.	Walla Walla, Wash.
Berlin, Germany.	Grand Rapids, Mich.	Medford, Wis.	San Francisco, Cal.	Watch Hill, R. I.
Buxton, Iowa.	Hastings, Neb.	Miamisburg, Ohio.	Santa Monica, Cal.	Wausau, Wis.
Cadillac, Mich.	Havana, Cuba.	Mount Olive, Ill.	Sioux City, Iowa.	Westerly, R. I.
Champaign, Ill.	Hazleton, Pa.	New Bedford, Mass.	South Bend, Ind.	Wilmington, Del.
Chicago, Ill.	Hopkinsville, Ky.	Oakland, Cal.	Spokane, Wash.	Woodstock, N. B., Canada.

AUTOMATIC ELECTRIC COMPANY, VAN BUREN and MORGAN STS. CHICAGO U. S. A.

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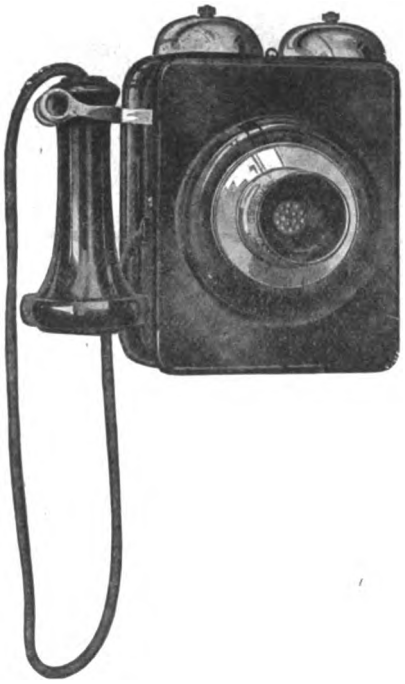
COMMON BATTERY TELEPHONES



Our Metal Cabinet Common Battery Telephones are self-contained, compact, accessible, light, indestructible and easily installed.

The terminals are easily reached by being placed well forward in the box. The internal wiring is with a specially insulated copper wire formed, beeswaxed and laced into a cable. By the varied colored insulations the circuits can be followed with ease.

The cabinet is of heavy steel, finished with a hard black enamel. The rigid and indestructible frame admits of a more permanent adjustment of the apparatus.

The lightness and compactness permits installer to carry and place ten of these telephones at a single trip, to one of the ordinary type.

They are equipped with the following standard parts:

New Solid Back Transmitter that combines ample volume, perfect articulation, deep penetration and natural pitch.

Permanently adjusted Receiver. The diaphragm does not rest on the outside shell, but on a bell-shaped metal seat---it isn't thrown out of adjustment by unequal expansion of hard rubber and metal.

New Ringer, provided with a knife edge bearing armature, adjusted by one screw---it can't tighten or drop out of place.

THE NORTH ELECTRIC CO.

Kansas City **Cleveland** **Dallas**

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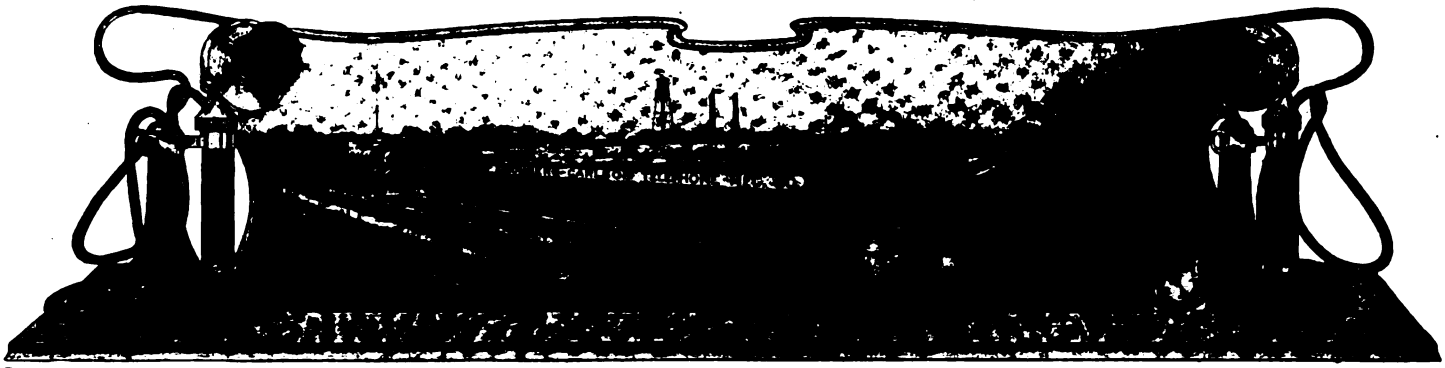
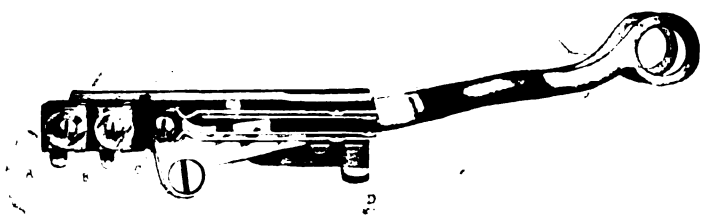
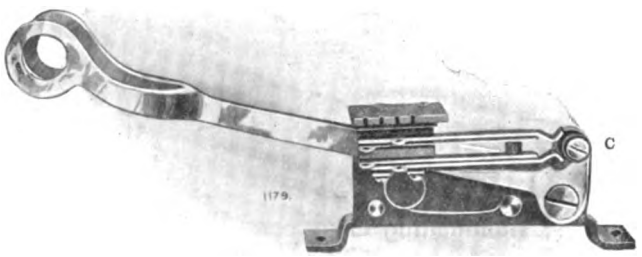


Stromberg-Carlson Efficiency and Durability are well and favorably known. The accompanying illustrations show two styles of Hook-switches, which for simplicity and mechanical construction are characteristic of Stromberg-Carlson Apparatus.



The movement of the hook downward causes the hard rubber insulated pin (C) to be drawn in between the German Silver



springs, thus breaking contact, while the upward movement of the hook allows them to come together and close the circuit. The very best of materials only are used. Thorough reliability and the highest efficiency are guaranteed. Manufacturers of Telephones and Switchboards of the highest grade for all classes of service.

If you will mention your requirements and this advertisement, descriptive bulletins will be mailed free.

STROMBERG-CARLSON TELEPHONE MFG. CO.

ROCHESTER, N. Y. CHICAGO, ILL.

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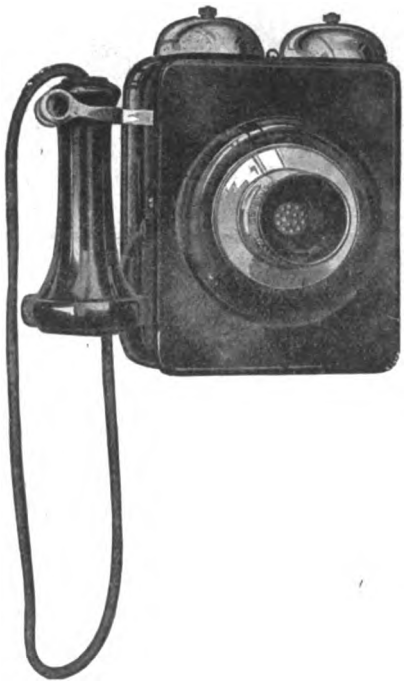
COMMON BATTERY TELEPHONES



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New Ringer, provided with a knife edge bearing armature, adjusted by one screw---it can't tighten or drop out of place.

THE NORTH ELECTRIC CO.

Kansas City **Cleveland** **Dallas**

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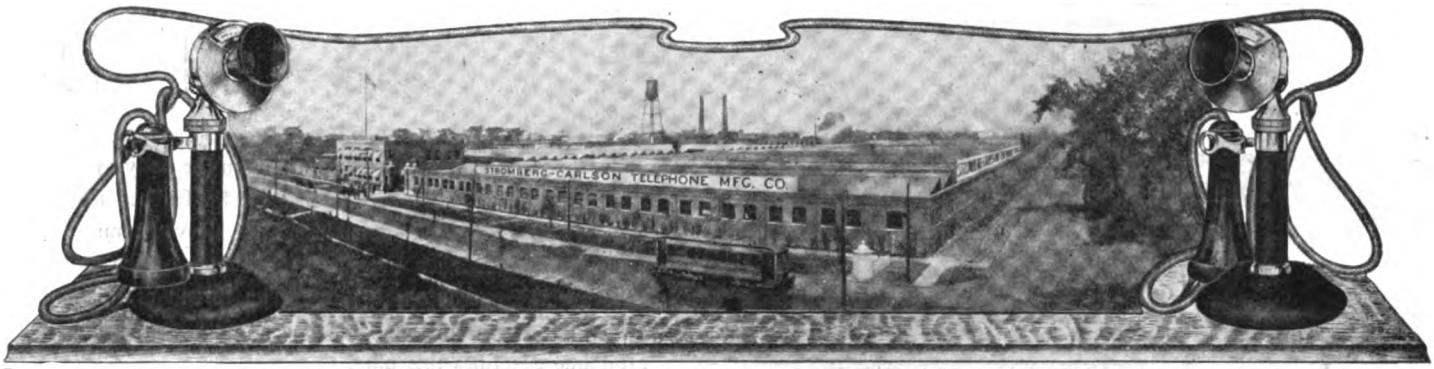

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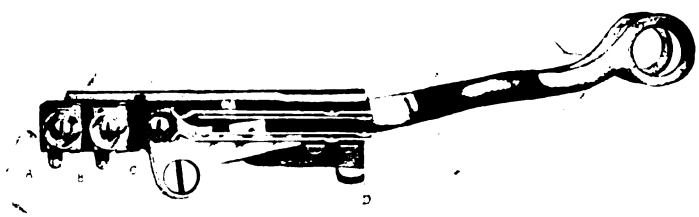

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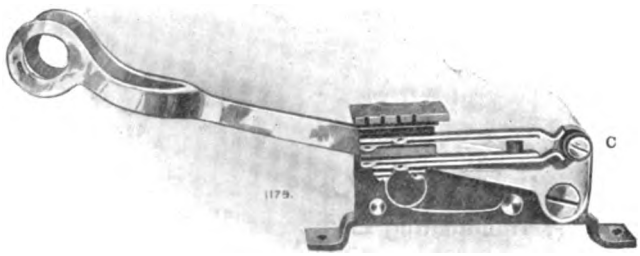

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If you will mention your requirements and this advertisement, descriptive bulletins will be mailed free.

STROMBERG-CARLSON TELEPHONE MFG. CO.

ROCHESTER, N. Y. CHICAGO, ILL.

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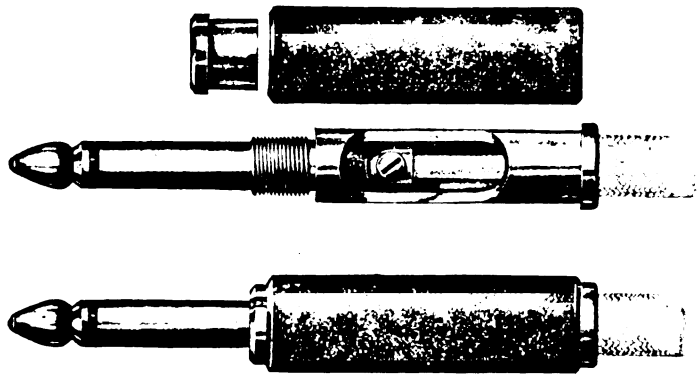

LITTLE THINGS THAT COUNT

The sleeve of the plug is loose, thus saving wear on cords. The tip connection is made within the body by a screw clamping the tip conductor of the cord. Rubber insulation makes short circuits impossible. The sleeve connection is made by turning back the sleeve conductor of the cord and screwing the end into the plug. The thread at this end is deep and coarse, making a strong perfect connection. Our catalogue describes this plug.

MONARCH TELEPHONE MFG. COMPANY, CHICAGO U. S. A.

Chicago's Banner Booster---Second Annual

Electrical Show

JANUARY 14-26
COLISEUM, CHICAGO

Greatest of All Trade Expositions

Thirty thousand sq. ft. of exhibits embracing every branch of the electrical field and including every leading manufacturer in America. 7,500 sq. ft. devoted to the telephone interests.

SPECIAL SOUVENIR DAYS---Benj. Franklin Day, Thursday, Jan. 17; Telephone Day, Monday, Jan. 21; Thomas A. Edison Day, Wednesday, Jan. 24.

SPECIAL DATES FOR ORGANIZATIONS---Northwestern Electrical Association, Jan. 16, 17 and 18; Illuminating Engineers' Society, Jan. 17; Rejuvenated Sons of Jove, Jan. 16; American Electrical Salesmen's Association, Jan. 24.

FOR ANY OTHER INFORMATION ADDRESS

HOMER E. NIESZ, - Managing Director

Electrical Trades Exposition Co. **1006-7 Monadnock Bldg.**

EVERY COIL

of **Roebling Double Galvanized Telephone Wire** bears a tin tag and lead seal upon which the word "**Roebling**" is stamped.

Don't accept Wire without the **Roebling Seal.**

JOHN A. ROEBLING'S SONS CO., - TRENTON, N. J.

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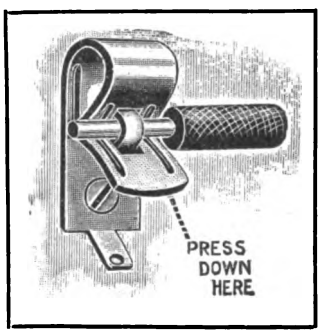
Central Telephone & Elec Co.... —
Century Telephone Const. Co.. —
Commercial Elec. Supply Co... 3
Cook, Frank B..... 11
Cope, T. J..... 11
Couch Co., S. H..... 38
Crumb, W. H., & Co..... 38
Dean Electric Co..... 4
Doubleday-Hill Electric Co..... —
D. & T. Anchor Co..... 11
Edwards-Hine Co..... 34
Electrical Trades Exposition Co.. 8
Fahnestock Electric Co..... 9
Ferguson Lumber Co..... 37
Fibre Conduit Co..... 9
Frankel Display Fix. Co..... 12
General Electric Co..... 38
General Storage Battery Co.... 34
Gest, G. M..... 39
Glenn Kline Lumber Co..... 37
Gould Storage Battery Co..... 3
Gray Telephone Pay Station Co. 34
Hallett Iron Works..... 2
Hemingray Glass Co..... —
Indiana Rubber & Insulated Wire Co..... 1
International Telep. Mfg. Co... 36
Kellogg Switchboard & Supply Co..... .....10 and 36
Klein, Mathias, & Sons..... 38
Lanz, M., & Sons..... 38
Leeds & Northrup Co..... —
Lindsley Bros. Co..... 37
Long Distance Telephone Mfg. Co.... 1
McMeen & Miller 38
Miller Anchor Co..... —
Monarch Telephone Mfg. Co... 8
Mountain State Electrical Co... 3
Nagel, W. G., Electric Co.9 and 12
National India Rubber Co..... 1
National Telephone Supply Co.. 36
North Electric Co..... 6
Okonite Co..... —
Osborne & Son, M. P..... 37
Pendleton & Gilkey..... 37
Pignolet, L. M..... 36
Plume & Atwood Mfg. Co..... 1
Porter Cedar Co..... 37
Premier Electric Co..... —
Roebling's, John A., Sons Co.. 8
Runzel Lenz Elec. Mfg. Co.... —
Simplex Electrical Co..... 1
Standard Underground Cable Co. —
Sterling Electric Co..... 5
Sterling, W. C., & Son..... 37
Stromberg-Carlson Tel. Mfg. Co. .....2 and 7
Sumter Tel. Mfg. Co..... 35
Swedish-American Tel. Co..... 12
Telephone Printing Co..... 38
Trumbull Electric Mfg. Co..... 11
U. S. Coin Register Co..... 9
Valentine Clark Co..... 37
Vote-Berger Co..... —
Wanted, Situations, etc..... 34
Waterbury Company 1
Wesco Supply Co..... —
Western Telephone Mfg. Co.... —
Weston Electrical Instrument Co..... 38
Williams Telephone & Supply Co. 38
Wire & Telephone Co. of America 35
Yonkers Specialty Co..... 1

THE FAHNESTOCK Spring Binding Post has all the reliability of a soldered joint.

The high tension of the spring cleans the wire and holds it firmly. There is no nut to work loose—in fact the more shaking and jarring, the better the contact.

That's why it's the ideal connection for TELEPHONE BATTERIES. REMEMBER, all dealers will supply your batteries fitted with Fahnestock Posts AT NO EXTRA COST if you will only specify them.



They're equally good on distributing frames, arresters, cable heads, and many like places in every exchange.

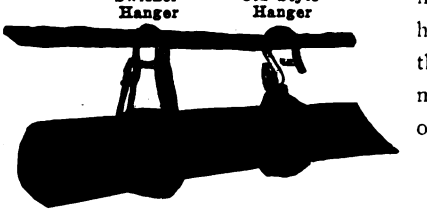
Write for sample post and booklet showing the kinds we carry in stock.

FAHNESTOCK ELECTRIC CO.
129 Patchen Avenue Brooklyn, N. Y.

SWISHER CABLE HANGER

(PATENTS PENDING)

This cable hanger is the result of a practical trouble man's effort to do away with the accidents and annoyances entailed in the use of old style hanger. Just compare the two. Descriptive matter and prices sent on application.



THE W. G. NAGEL ELECTRIC CO.
28-30 ST. CLAIR STREET, TOLEDO, OHIO

U. S. COMBINED

Cash Register and Pay Station

[The PIONEERS in this line]

THE BEST TELEPHONE SERVICE

Measured Service Pay Station

One Gong Only.
A cash ticket with every collection.
A tape numbered from 1 to 2,000 does the work.
Cash always accounted for.
No Errors,
No Disputes,
No Troubles.
It protects both patron and company.
It keeps collections right.
It makes you money.
Write at once for particulars and catalogue.

THE
United States Coin Register Co.
TOLEDO, OHIO

ORANGEBURG
FIBRE CONDUIT
For Underground Systems

Write for Catalogue.

THE FIBRE CONDUIT COMPANY,
Orangeburg, N. Y.
Boston Office, 110 State St. Chicago Office, 1760 Monadnock Bldg.

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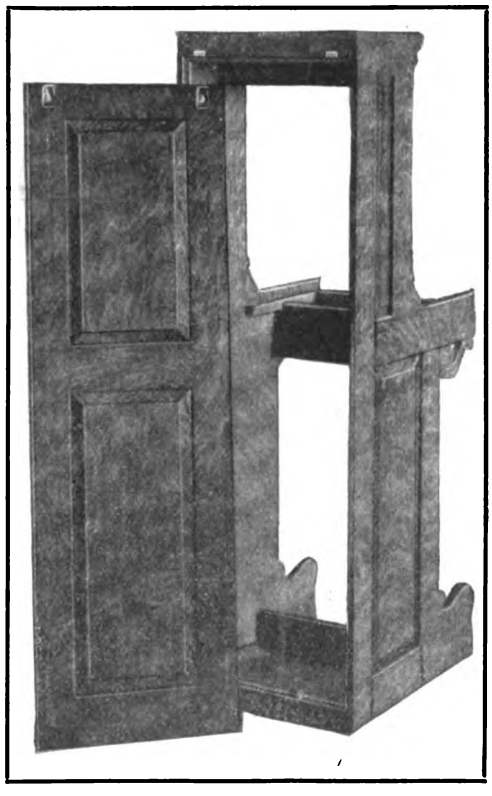
KELLOGG

TELEPHONE

MAGNETO SWITCHBOARDS

APPARATUS



The Absolute Standard of Quality

HAS RECEIVED

HIGHEST AWARDS

Gold Medal	Buffalo,	1901
Grand Prize	St. Louis,	1904
Grand Prize	Milan, Italy,	1906

ONE highest award suggests chance of possible error in judgment.

Two ridicule such suspicion.

Three in succession prove absolutely the marked superiority of the apparatus thus awarded.

Kellogg apparatus has been, and is now acknowledged by all experts to be the best and the most satisfactory of all makes in design, materials and construction.

The above cut shows the woodwork of a 100-line express type Magneto Switchboard without any metal attachments.

The kiln-dried quartered-oak is perfectly matched, very solidly joined and constructed to give most satisfactory wear and durability.

The machinery used in this construction is in every way the most up-to-date obtainable.

Note the beautiful finish on every Kellogg switchboard---fine varnish---hand rubbed.

Write for our "Bulletin 9A" which describes completely our Magneto Switchboards.

BRANCH OFFICES:

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Keystone Tel. Bldg.	Electric Bldg.	1413 Main St.	318 W. Second St.

KELLOGG SWITCHBOARD & SUPPLY COMPANY
CHICAGO, ILLINOIS, U.S.A.

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will look well and wear better

WRITE US TODAY and we will quote prices and tell you why Belden Cords are more durable than others.

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BELDEN MANUFACTURING COMPANY

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Locust Pins in Toledo

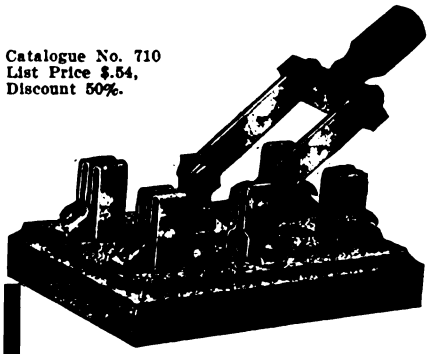
stock for quick shipment at right prices. Get our figures on genuine Locust before buying some other kind which will rot quickly. Locust lasts.

TOLEDO, OHIO · THE F. BISSELL COMPANY · TRADE MARK

THE F. BISSELL COMPANY.

TOLEDO, O.

Catalogue No. 710
List Price $.54,
Discount 50%.



A SMALL SWITCH-BOARD...

MADE OF

TRUMBULL ALL-COPPER TELEPHONE SWITCHES

is just as efficient as a high priced plug and cord board.

It has several distinct advantages for small systems. Anyone can make such a board up to one hundred lines from our diagrams. The operation of the board being very simple requires no experience.

In first cost such a switchboard is very cheap and there is no maintenance.

WRITE FOR DIAGRAM

TRUMBULL ELECTRIC MFG. CO.

618 Woodford Ave., PLAINVILLE, CONN.

Patented April 24, 1900.

Cope's Patent Cable Rack and Conduit Rods

FOR MANHOLES, VAULTS AND DUCTS.

Cheapest, strongest and most convenient CABLE RACK made. Costs but little more than wood and is indestructible, more durable and convenient.

CONDUIT RODS are made in 3 and 4 foot lengths. Quickly coupled and uncoupled, they are the best rod on the market.

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T. J. COPE 3244 NORTH 15th ST., PHILADELPHIA, PA.

Manufacturer of all tools appertaining to Underground Construction
Write for catalogue describing Cope specialties.

SAVES TIME and EXPENSE

because it is quickly installed in any locality.

THE

D. & T. Anchor

saves time and consequently money. It requires no digging and a twist opens the blades, forcing them into unbroken earth.

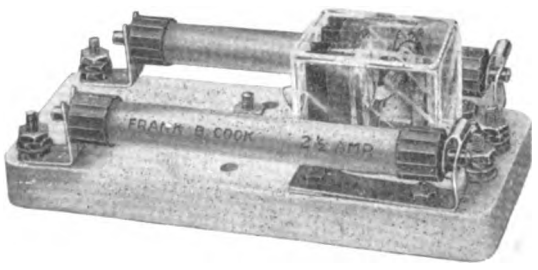
Easily driven in hard or stony ground

WILL HOLD ANYWHERE

THE D. & T. ANCHOR CO., La Crosse, Wis.

PROTECTION IS CHEAP

Cheap at Any Cost—Always Cheaper than Buying Damage Suits, Fire Losses or New Telephones



Your telephones are not immune just because lightning storms are over for the season. Snow and sleet storms cause many crosses with high voltage lines. Such crosses cause bad fires and accidents. COOK'S TYPES B4-B5-B6 PROTECT YOUR TELEPHONES. ASK MORE ABOUT THEM.

Frank B. Cook. Mfr.

238 W. Lake Street CHICAGO, ILL

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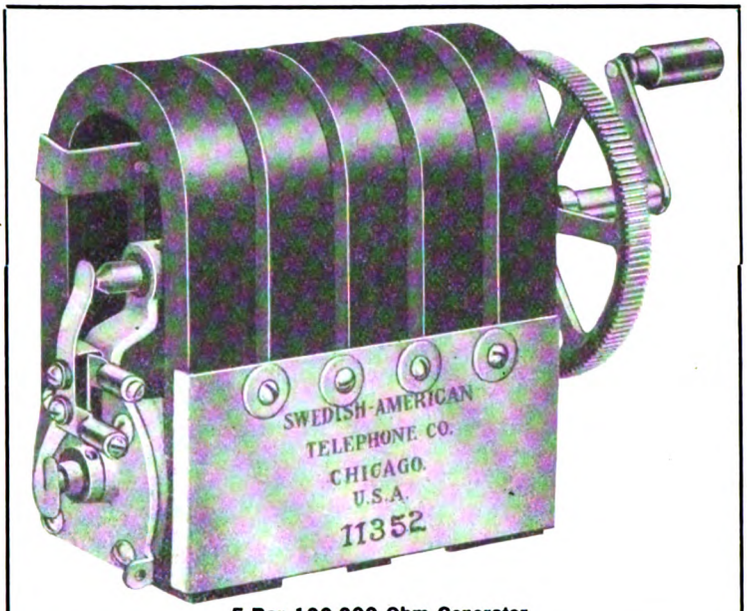
SWEDISH-AMERICAN GENERATORS



5-Bar 100,000 Ohm Generator

will ring ALL the bells on your lines loud and clear.

SPECIFICATIONS

Imported Swedish steel magnets. Laminated armature of soft Norway iron, accurately fitted on steel shaft. Wide face gear wheels, noiseless running. Best grade silk magnet wire. German silver contact springs. All parts accurately fitted. OUTPUT sufficient for heaviest loaded lines.

All of our product is built with a view of permanency. Our 1907 proposition will interest you. Ask for catalogue.

SWEDISH-AMERICAN TELEPHONE CO.

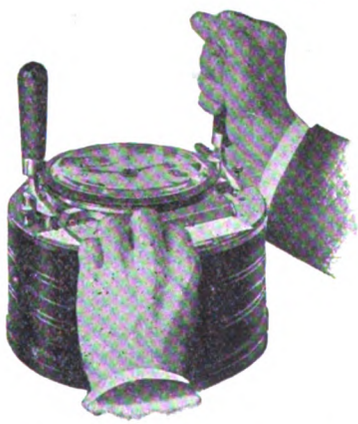
CHICAGO, ILL.

Branch—Kansas City, Mo., 115 West 6th St.

IN CASE OF DISPUTE

OVER THE DURATION OR DATE OF A TOLL MESSAGE

Show the Calculagraph Record



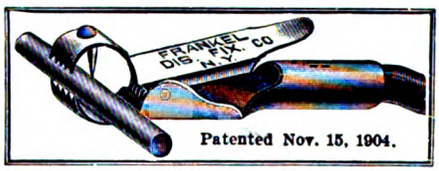
Subscribers often forget a toll conversation by the time they receive your monthly bill. The Calculagraph Record on the toll ticket is indisputable evidence. Let us send you other reasons.

IT MAKES NO CLERICAL ERRORS

CALCULAGRAPH CO.

1437 Jewelers' Building **New York City**

Agents for Canada: Northern Electric and Manufacturing Co., Ltd., Montreal.



Patented Nov. 15, 1904.

Sample Doz...$1.50 Dozen
Lots of 100...11.00 Hundred
Lots of 500...10.00 Hundred
Lots of 1,000. 9.00 Hundred

Your Supply House carries them. If not order direct.

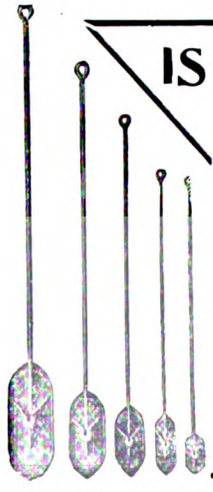
FRANKEL'S TESTING CLIPS

For testing Insulated or Bare Wire Lines.
Save 15 to 30 Minutes on every Test.
Unnecessary to "skin" the wire.
Obviate "breaks" and use of Tape.

Get them for your Inspectors, Linemen and Installers.

THEY SAVE MONEY

FRANKEL DISPLAY FIXTURE CO., 740-742 Broadway, N. Y.



IS YOUR EDUCATION COMPLETE?

You know there are many patented anchors on the market, but *DO* you know that the HERCULES MALLEABLE IRON ANCHOR is the only anchor that can do the work equally as well as the old style "Deadman"?

Send for descriptive matter and prices.

The W. G. Nagel Electric Co.

28-30 ST. CLAIR STREET **TOLEDO, OHIO**

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PINS · BRACKETS · CROSSARMS

WE MAKE CROSS ARMS, PINS AND BRACKETS
Prompt Shipment. Write Us.
CENTRAL MFG. COMPANY, - - - CHATTANOOGA, TENN.

M. P. OSBORNE & SON
MANUFACTURERS OF
Insulator Pins and Brackets
LOW PRICES PROMPT SHIPMENTS
CAMDEN—NEW YORK

CROSS ARMS CAR LOTS OR LESS
YELLOW PINE OR CYPRESS
DIRECT FROM MANUFACTURERS
FERGUSON LUMBER CO., LITTLE ROCK, ARK.

CROSS ARMS IN TOLEDO stock, yellow pine, for quick shipment. Special prices on standard 10ft. 10 pin.
THE F. BISSELL COMPANY.
TOLEDO, O..

We Make a Specialty of Telephone Poles.
POLES
Large Stock
16 to 25 ft.
4 to 6 in. Tops
For Rural Lines
POLES
YARDS:
Menominee, Mich.
Escanaba, "
Cloquet, Minn.
Heron, Mont.
Cabinet, Idaho.
Chicago, Ill.
FRANCIS BEIDLER & CO.
459-519 W 22d St.
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WHITE CEDAR **POLES** Longest Lasting Best Grade
40,000 IN STOCK NOW. 100,000 TO 150,000 BY APRIL 1st
25 YEARS HAVE WE BEEN PRODUCING POLES. WRITE US
Yards { Omer, Bay City and Boyne Falls
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Buy from the Producers and Save Jobbers' Profits.
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THE F. BISSELL COMPANY
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POLES
20 and 25 foot lengths for rural telephone lines a specialty.
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POLES and PILING
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LARGE STOCKS PROMPT SHIPMENTS
THE VALENTINE-CLARK CO.
ERNEST L. CLARK, PRES.
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PRODUCERS AND SHIPPERS OF
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HARRISON, N. J.
EDISON
TELEPHONE LAMPS 869

M. LANZ & SONS
Manufacturers of
Pressed Steel Guy Clamps
We Galvanize by the Hot Process
PITTSBURG, PA.

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Manufacturers of
The "Couch" Automatics
S. H. COUCH CO., Inc., 162 Pearl St BOSTON, MASS.

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FOR NEXT YEAR GET THE BEST
That's Our "New Form"
Many companies are now using it, and all are pleased. Ask for circular describing it. Order early and avoid the rush.
WE ALSO FURNISH

Toll Tickets.	Trouble Tickets.
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All kinds of blanks, books and forms for Telephone and Toll Line Accounting. Write for sample forms and prices.
TELEPHONE PRINTING COMPANY
Defiance, Ohio

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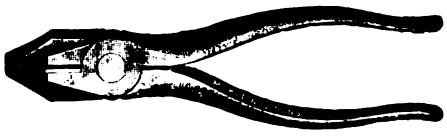
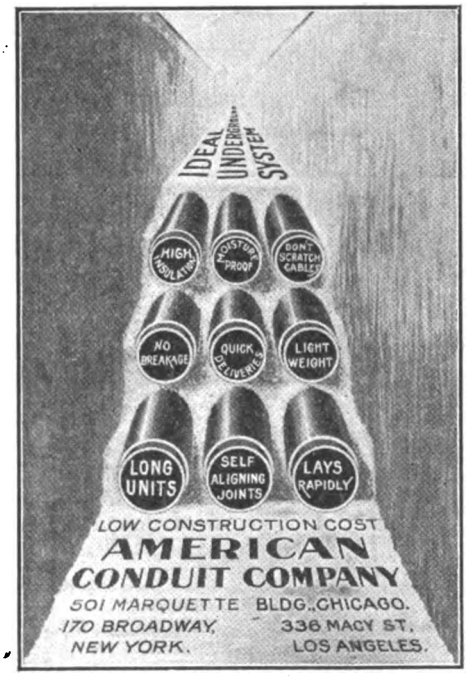

For the protection of our customers we advise that Klein's Pliers are being imitated to LOOK LIKE KLEIN'S. This, however, does not make them Klein's. **CAUTION.** Look for this stamp, M. KLEIN & SONS, on the inside of handles—NONE are genuine without this stamp.
Use only genuine Klein's. They are the product of years of experience and have stood the test of time.
MATHIAS KLEIN & SONS - CHICAGO, ILL.

SAMUEL G. McMEEN KEMPSTER B. MILLER
McMEEN & MILLER
ENGINEERS: CONSTRUCTORS
Telephone and Telegraph Properties
MONADNOCK BLOCK CHICAGO



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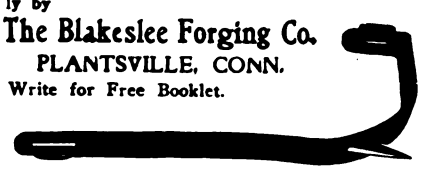
Plans and Specifications for Complete Telephone Equipments. Existing Plants Remodelled.
Private Branch Exchanges Installed. Engineer for
WILLIAMS TELEPHONE & SUPPLY CO.
No. 79 CENTRAL AVENUE, CLEVELAND, OHIO

W. H. CRUMB & COMPANY
ENGINEERS CONTRACTORS
TELEPHONE ENGINEERING AND OONSTRUOTION
Plans, Specifications and Estimates Promptly Furnished
First National Bank Building CHICAGO, ILL.

The Celebrated
DONNELLY CLIMBER
is made of the toughest and best steel obtainable. It is guaranteed not to break. You can trust your life to it with perfect safety.
The Donnelly climber is now made exclusively by
The Blakeslee Forging Co.
PLANTSVILLE, CONN.
Write for Free Booklet.


WESTON
STANDARD PORTABLE DIRECT READING
Voltmeters, Ammeters, Millivoltmeters, Voltammeters, Milammeters, Ohmmeters, Portable Galvanometers, Ground Detectors and Circuit Testers.
Our Portable Instruments are recognized as THE STANDARD the world over. Our STATION VOLTMETERS AND AMMETERS are unsurpassed in point of extreme accuracy and lowest consumption of energy.
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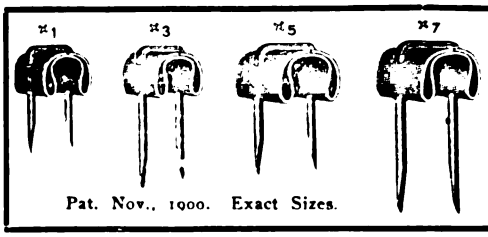
Weston Standard Portable Direct Reading Voltmeter.

AN AMERICAN JOURNAL For AMERICAN INDEPENDENT TELEPHONE MEN
Read from Atlantic to Pacific; Canada to Mexico; and overflows into all other countries.



Pat. Nov., 1900. Exact Sizes.
Blake Insulated Staples
Blake Compressed Cleats
Manufactured and For Sale by
Blake Signal & Mfg. Co.
246 Summer St., Boston, Mass.

Exact size. Patented July, 1906.

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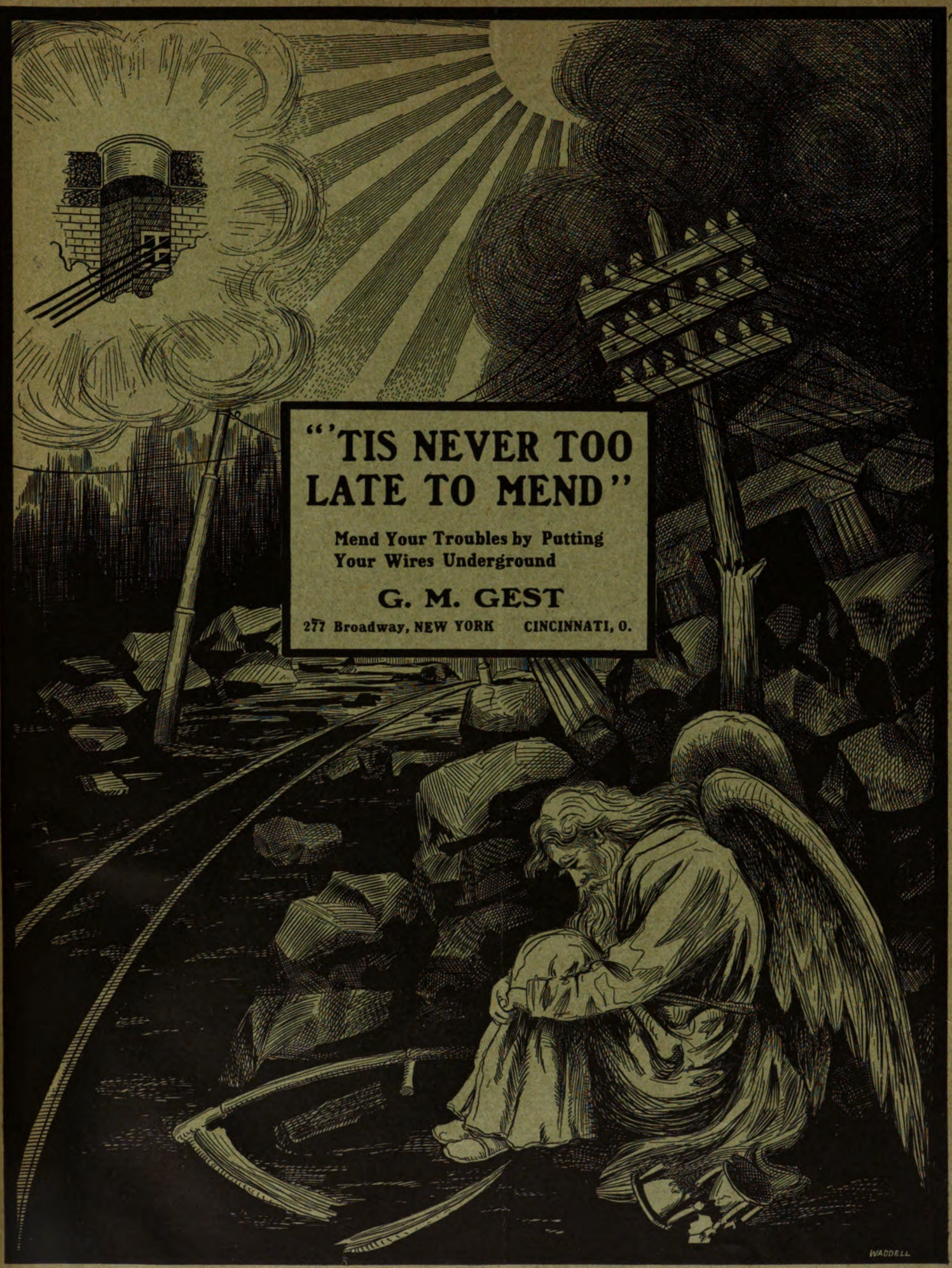
"'TIS NEVER TOO LATE TO MEND"
Mend Your Troubles by Putting Your Wires Underground
G. M. GEST
277 Broadway, NEW YORK CINCINNATI, O.
WADDELL

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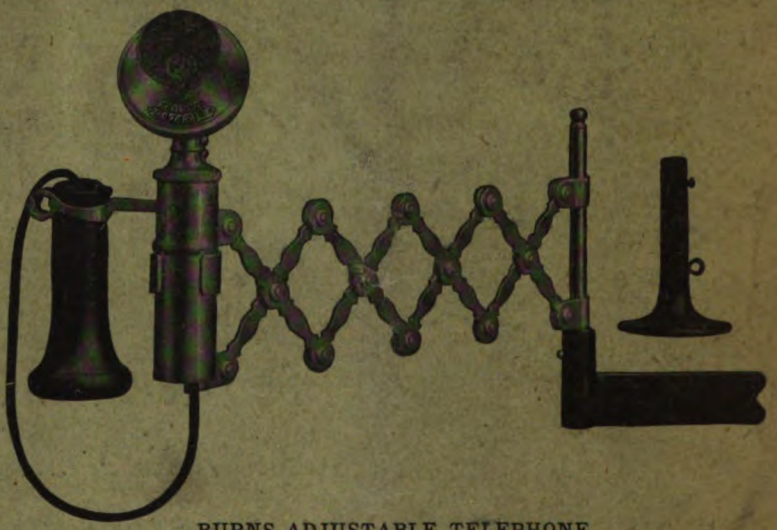
DESK TELEPHONES

¶Do you find that to maintain desk telephones in service costs more than to maintain wall telephones?

¶Then try our Burns adjustable desk telephone! Held securely to the desk! Will not drop! Is more convenient for your subscriber!



BURNS ADJUSTABLE TELEPHONE

NO. 43 DESK TELEPHONE.

Telephones and Switchboards for Exchanges of all sizes

¶Do you wish to reduce the maintenance expense of your desk telephones?

¶Try our No. 43!

¶One screw in the base securely holds the entire set together!

¶Can be taken all apart in a second!

¶Trouble can be instantly cleared!

¶Can be just as rapidly assembled!

AMERICAN ELECTRIC TELEPHONE COMPANY

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THE TECHNICAL PRESS, 15 VANDEWATER ST., NEW YORK.

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